Minutes of

23rd Meeting of the BALTEX Science Steering Group

held at

Finnish Meteorological Institute
Helsinki, Finland

12 - 14 January 2009

edited by

Hans-Jörg Isemer

Participants at the 23rd BALTEX Science Steering Group Meeting, from left to right: Juha-Markku Leppänen, Berit Arheimer, Timo Vihma, Bernd Schneider, Jarmo Koistinen, Michael Lautenschlager, Hans von Storch, Jüri Elken, Sirje Keevallik, Janusz Pempkowiak, Franz Berger, Valery Vuglinski, Jörgen Nilsson, Jan Thiele. In front: Joakim Langner (left) and Hans-Jörg Isemer

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Summary of Decisions

DECISION 1: Berit Arheimer, Head of the Hydrology Unit at the Research Department of SMHI was approved as new BSSG member.

DECISION 2 (amended in May 2009): The 6th International Study Conference on BALTEX shall be conducted during **14 to 18 June 2010** in Międzyzdroje, island of Wolin, Poland.

Summary of Action Items

Action Item 1 to the BALTEX Working Group on Data Management to continue to report on relevant data sets for BALTEX research and, together with ***the BALTEX Secretariat***, make access to these data sets available also via the BALTEX web site.

Action Item 2 to the BALTEX Working Group on the Utility of Regional Climate Models and the BALTEX Secretariat to prepare for a workshop on Regional Climate Modelling in Lund in 2009.

Action Item 3 to the BALTEX Secretariat to prepare for a summer school in 2009 in co-operation with EurOceans.

Action Item 4 to Jarmo Koistinen, Daniel Michelson and the BALTEX Secretariat to undertake steps to promote the BRDC weather radar based data set appropriately both inside and outside BALTEX, and additionally ***to Burkhardt Rockel and Markus Meier (WG on the Utility of Regional Climate Models)*** to establish a small expert group with the view to explore possibilities of using the BRDC precipitation data set for regional modelling validation and hydrological applications.

Action Item 5 to Marcus Reckermann and the BALTEX Secretariat to finalize a draft version of a *BALTEX outreach website for the public* in cooperation with authors of the BACC book annexes, BSSG members, and others, as appropriate, and launch the new website subsequently in parallel to the existing BALTEX homepage.

Action Item 6 to Hans von Storch and the BALTEX Secretariat to continue interacting with BSSSC, particularly the BSSSC Secretariat, with the view to contribute to organizing a close cooperation between BALTEX and BSSSC in the fields of adaptation to climate change and improving climate experts – regional decision makers interactions.

Action Item 7 to the BALTEX Secretariat to follow ESSP developments and report accordingly at forthcoming BSSG meetings.

Action Item 8 to the BALTEX Secretariat and all BSSG members to monitor running global and regional programmes and projects regarding their overlap with BALTEX Phase II objectives.

Action Item 9 to all BSSG members to begin developing ideas and making initial plans on the role and profile of a potential follow-up programme to BALTEX beyond 2012.

Action Item 10 to the BSSG Chair and vice-chairs, selected BSSG members and the BALTEX Secretariat to i) finally edit the revised BALTEX Phase II objectives, goals and potential activities, ii) to finalize editing necessary text related to the changes in objectives, goals and potential activities, iii) decide on a suitable publication of the revised BALTEX Phase II objectives, and iv) iterate for approval with the whole BSSG on i) to iii) as appropriate.

Action Item 11 to the BALTEX Secretariat and Janusz Pempkowiak to continue preparations for the 6th Study Conference on BALTEX in 2010 along the lines discussed at this meeting.

Action Item 12 to the BALTEX Secretariat to clarify time and location of the next BSSG meeting and communicate to BSSG members accordingly in due time.

Note on Appendices

The minutes contain two sets of Appendices: Key appendices, which are limited concerning size and mainly black/white, are numbered chronologically and are part of the published paper copy. Extended coloured material, mostly copies of presentation material shown at the meeting, are included in a set of appendices available in electronic form only via the BALTEX website at http://www.baltex-research.eu/supplementary/index.html. The latter appendix numbers start with an E, *e.g.* Appendix E1.

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Introduction

The 23rd meeting of the BALTEX Science Steering Group (BSSG) was held during 13 and 14 January 2009 at the Finnish Meteorological Institute (FMI) in Helsinki, Finland. On 12 January, a dedicated BALTEX workshop entitled "Winters with reduced snow and sea ice: Probability of occurrence and implications in the Baltic Sea catchment area" was held in conjunction with the BSSG meeting, see Appendix 1 for the workshop's agenda. A series of presentations alluded to observational evidence on past variability and trends as well as to projections related to snow and sea-ice in the Baltic Sea catchment and possible implications for marine and terrestrial ecosystems, as well as the society. More than 50 participants followed the presentations and contributed to lively discussions. Presentations given at the workshop are available via the BALTEX website at www.baltex-research.eu/supplementary/.

BALTEX Science Steering Group meeting

Opening and welcome

Timo Vihma, vice-chair of the BSSG, opened the meeting on behalf of the host and welcomed all participants at the premises of FMI. He noted the commitment of FMI to the BALTEX programme and recalled FMI being among the founding members of the BALTEX SSG already in 1994. He briefly mentioned the recent reorganisation of the marine research in Finland, where the activities of the former Finnish Institute of Marine Research (FIMR) will be continued by the Finnish Environment Institute (SYKE) and FMI as of 1 January 2009. The new Marine Centre at SYKE will be responsible for research on issues like the status of the Baltic Sea and its changes, eutrophication, marine biodiversity, and invasive species. Research on physical oceanography and marine safety services will be under the responsibility of FMI.

Joakim Langner, chairman of the BALTEX Science Steering Group, took the meeting's chair by welcoming meeting participants, which are listed in Appendix 2.

TOPIC 1: Organisational issues

1.1 Approval of the agenda

Joakim Langner suggested adding a topic to the agenda where preliminary thoughts on options for BALTEX after the year 2012, the latter being the final year of BALTEX Phase II as fixed in the current BALTEX science and implementation strategy plan, may be initially discussed. This was added to the agenda as topic 4.3. With this addition, the agenda for the 23rd BSSG meeting was unanimously approved (Appendix 1).

1.2 Approval of the previous BALTEX SSG meeting minutes

The minutes of the 22nd BSSG meeting were unanimously approved.

1.3 Review of previous BALTEX SSG meeting Action Items

Of the 11 action items of BSSG#22, four items were considered completely accomplished. Several action items were considered as partially accomplished but will remain on the action item list as ongoing actions. Several of those will be discussed at the relevant agenda topic; at

this point, the following action items were identified and approved as ongoing item, as follows.

Action Item 1 to the BALTEX Working Group on Data Management to continue to report on relevant data sets for BALTEX research and, together with ***the BALTEX Secretariat***, make access to these data sets available also via the BALTEX web site.

The following action is successfully on track with the 2nd Lund Regional-scale Climate Modelling Workshop entitled: "21st Century Challenges in Regional-scale Climate Modelling" being planned to be conducted during 4 to 8 May 2009 in Lund, Sweden.

Action Item 2 to the BALTEX Working Group on the Utility of Regional Climate Models and the BALTEX Secretariat to prepare for a workshop on Regional Climate Modelling in Lund in 2009.

The same holds true for the following action item, where the planning for an international summer school entitled "Climate impacts on the Baltic Sea - From science to policy" to be held 27 July to 7 August 2009 in Nexø, Bornholm, Denmark is progressing.

Action Item 3 to the BALTEX Secretariat to prepare for a summer school in 2009 in co-operation with EurOceans.

1.4 BALTEX SSG membership changes

Both **Jörgen Nilsson** and **Phil Graham** had indicated their wish to resign from the BSSG prior to the meeting. With regret, the BSSG noted these changes and expressed its appreciation to both for their numerous contributions to the steering of the BALTEX programme. Jörgen's several actions towards revising the BALTEX data storage and access issues were particularly highlighted as was his engaged chairmanship to the BALTEX Data Management Working Group.

Further, the withdrawal of **Jan Piechura**, which had been indicated already at the previous BSSG meeting, was officially confirmed. Jan will continue to support the preparation of the next International Study Conference on BALTEX to be held in Poland in 2010.

As a reaction to the above withdrawals, Joakim Langner proposed **Berit Arheimer,** Head of the Hydrology Unit at the Research Department of SMHI as a new BSSG member. The proposal including Berit's CV (see Appendix 3) had been communicated to BSSG members prior to this meeting. Berit is a hydrologist, as Phil and Jörgen, and has been actively involved in BALTEX, e.g. as a member of the writing team of the science plan for BALTEX phase II. The BSSG unanimously approved Berit Arheimer as BSSG member and welcomed her to the group.

DECISION 1: Berit Arheimer, Head of the Hydrology Unit at the Research Department of SMHI was approved as new BSSG member.

TOPIC 2: Status of BALTEX Phase II Implementation and Achievements

2.1 Report of the BSSG Chairman

Joakim Langner started his report by acknowledging the new reporting mechanism conducted prior to this meeting as useful. Following an action item of the previous BSSG meeting, all BSSG members had been asked to submit a short written report on BALTEX-related activities in 2008 to the BSSG chair via the Secretariat in due time before this meeting. The majority of the BSSG members followed this request. The submitted and slightly edited reports are given in Appendix 4. The reports cover activities in 6 countries (Estonia, Finland, Germany, Poland, Russia and Sweden) with more than 20 institutions or organisations involved. At least than 6 events (workshops, conferences) were conducted in 2008, and 7 events planned for 2009 were mentioned. A total of more than 75 peer-reviewed BALTEX publications were reported.

Joakim continued his summary by noting that ongoing activities are reported for all objectives of BALTEX phase II. Previous assessments of the progress of BALTEX towards the main science objectives had noted the comparatively low activity reported on some objectives. For 2008, substantial activities were reported on objective 4 (12 in total with some 23 peer-reviewed publications), while objective 3 had the lowest activity profile with just one activity and 5 publications being reported. Joakim mentioned the publication of and follow-up activities to the BACC book (see further at topic 2.2) as a major BALTEX achievement in 2008. Of equal importance are three new major international BALTEX projects funded by BONUS+ (BALTIC-C and ECOSUPPORT) and INTERREG (BALTRAD). See more details at topics 3.2 and 2.2.1, respectively.

As an example for conducted events in 2008, Joakim highlighted the TELLUS - BALTEX Workshop on *Biogeochemical Land and Baltic Sea Interactions driven by Climate and Land Use,* held 1 and 2 December 2008 at University of Gothenburg, Sweden. The workshop was successful in bringing together the terrestrial and marine biogeochemistry research communities. The workshop emphasized on potential impacts due to climate and land use change. 61 participants from Sweden, Finland, Lithuania and Germany attended and 15 presentations covering modelling and process studies of matter fluxes (carbon, nutrients) from the source regions to the Baltic Sea were given. Key BALTEX speakers included Anders Omstedt, Markus Meier, Benjamin Smith and Joakim Langner. Extended presentation materials are available at www.baltex-research.eu/TellusBaltex/, a summary article on the workshop was published in the recent BALTEX Newsletter #12 in December 2008.

Joakim finished his report by explaining CO_2 / carbon cycle research of Bernd Schneider's group at Institute of Baltic Sea Research Warnemünde (IOW) and results of the Baltic Sea monitoring cruises 2008 conducted at Institute of Oceanology PAS in Sopot as two examples of the BALTEX-related activities reported in the national reports.

BSSG acknowledged with satisfaction both the high activity and event profile of BALTEX in 2008 as well as the substantially comprehensive number of planned activities in 2009.

2.2 Working Group Reports

2.2.1 Working Group Radar

The chair of the BALTEX Working Group on Radar (BWGR), Jarmo Koistinen, gave a comprehensive overview presentation with the focus on four issues, as follows:

- **the status of the BWGR:** Jarmo recalled that BWGR is the "oldest" BALTEX Working Group, which has met at least annually since 1995. BWGR had its most active time during 1997 to 2002 when most of the techniques leading to the present BALTEX Radar Data Centre contents were established. Jarmo explained that BWGR has developed since then into a pan-European working group by merging with *e.g.* the NORA initiative within NORDMET. NORA aims at fostering the Nordic development of common operational algorithms and software to create new radar products or improve existing ones for the quantitative use of radar data. NORA presently organises the annual Baltic Weather Radar Workshop (BWRW) with open participation together with national radar teams and the BWGR. The most recent BWRW was conducted in Poland in September 2008. As a summary conclusion, the BWGR is presently somewhat hidden as a dedicated BALTEX instrument although its members are active in national and international R&D efforts.

- **the status of the BALTEX Radar Data Centre (BRDC):** Ever since, the BRDC has been and is hosted and maintained by SMHI with Daniel Michelson as the BRDC manager. Among the various data sets stored at and offered by BRDC, a both 3-hourly (BALTRAD area) and 12-hourly (BALTEX region) gauge-adjusted rain data set with a 2km x 2km horizontal resolution covering 10 years (1999-2008) is now available.

- **examples of weather radar related research at FMI:** Jarmo stressed that deriving precipitation rates from weather radar signals is currently subject of numerous basic research activities. BWGR is much too small and heterogeneous to be able to perform or promote common research activities. Members are bound to operations or, those in research, to externally funded projects defining the targets of interest. He briefly explained some related ongoing projects at FMI dealing with *Derivation of Extreme Event Mesoscale Area-intensity Return Periods of Rainfall Based on a Large Sample of Radar Data* and *Research collaboration with NASA's Global Precipitation Measurement (GPM) mission* or *Multidisciplinary applications of polarimetric weather radars (POMO)*.

- **a new BALTRAD project:** Recently, a project proposal *An advanced weather radar network for the Baltic Sea Region (BALTRAD)* was positively evaluated and approved for funding through the INTERREG IV Baltic Sea Region 2007-2013 programme (http://eu.baltic.net/). The project is planned to run for 3 years with a 2.2 Mill Euro overall funding and is coordinated by Daniel Michelson at SMHI. The project is not primarily a research project but focuses on harmonizing production practises to provide end users with radar products of as high quality as possible - rain rate, wind, and hail warnings. Several weather and hydrological services in the Baltic Sea region have been in dialogue in recent years about creating such a new radar network, but this has not been possible without external funding. The BALTRAD project will also contribute the technology for exchange of weather radar data in the World Meteorological Organization (WMO) Information System, the successor of the GTS being used today.

The full material presented by Jarmo is given in Appendix E1.

BSSG members appreciated the long-term commitment of BWGR members and especially of the two lead persons, namely Jarmo Koistinen and Daniel Michelson. The present situation of BWGR, being now part of other international weather radar initiatives, was acknowledged as a logical and fruitful development and Jarmo was encouraged to continue all suitable activities to advance the weather radar network for the BALTEX region. The BSSG congratulated Daniel Michelson and the BALTRAD project team for their recent success.

The now available radar-based 10 years precipitation data set at BRDC was highlighted again and BSSG members suggested exploring

i) to what extent this data set may be made more visible as a BALTEX success story, both internally in BALTEX but also at the relevant GEWEX and WCRP levels. The GEWEX Conference in 2009 and the GEWEX Newsletter were mentioned as examples for suitable outreach means.
ii) possible further application *e.g.* in the context of regional climate model validation and hydrological application.

A small expert group was suggested to be established with the objective to explore the application potential of the weather radar based data set available at BRDC particularly for the RCM community. Ad-hoc suggestions for this group's members included Jarmo Koistinen (FMI), Burkhardt Rockel (GKSS), Franz Berger (DWD) and Jonas Olsson (SMHI).

Action Item 4 to Jarmo Koistinen, Daniel Michelson and the BALTEX Secretariat to undertake steps to promote the BRDC weather radar based data set appropriately both inside and outside BALTEX, and additionally ***to Burkhardt Rockel and Markus Meier (WG on the Utility of Regional Climate Models)*** to establish a small expert group with the view to explore possibilities of using the BRDC precipitation data set for regional modelling validation and hydrological applications.

2.2.2 Working Group BACC II

Hans von Storch, chair of the BACC (BALTEX Assessment of Climate Change for the Baltic Sea Basin) II Working Group, reported on a meeting, the BACC II WG held the day before, 12 January 2009 in Helsinki. The approved minutes of this meeting are enclosed here as Appendix 5. The overall aim of the BACC II initiative is to establish a follow-up assessment report by 2013. The BACC WG II meeting resulted in a first agreement on the objectives of BACC II, a tentative BACC II report contents, as well as the first time plan for BACC II. Major contents changes for the BACC II report - compared to BACC I - include additional chapters on i) past climate change during the recent 1000 years, ii) effects of changing regional drivers – industrial aerosols and land-use, iii) socio-economic impacts, and iv) empirical evidence for consensus and dissent among regional climate researchers.

Hans recalled that the present BACC II Working Group members are at the same time expected to form the nucleus of the new Science Steering Committee for BACC II (BACC II SSC). The key task of the SSC is to guide the BACC II process. SSC members should not be involved in documenting the BACC II assessment, but one prominent task will be to identify, approve and motivate lead authors (and, if appropriate, also contributing authors) for the BACC II chapters.

BSSG members suggested including relevant stakeholders at an early as possible stage in order to harmonize with time table requirements of such stakeholders. Hans mentioned the continuous interest of HELCOM in the BACC process, which is also manifest by a HELCOM Secretariat staff member being a member to the BACC II WG (Maria Laamanen). **Mikko Alestalo** agreed to become member to the BACC II WG.

According to Hans, the immediate actions for the WG are to complete its membership during spring 2009 and follow-up with the identification and approval of chapter lead authors before the summer break 2009.

BSSG expressed its satisfaction with the timely re-start of the BACC initiative and encouraged Hans and the WG to proceed along the lines presented and discussed (see Appendix 5 for more details on BACC II and Appendix E2 for the presentation on BACC given by Hans).

2.2.3 Working Group on the Utility of Regional Climate Models

Joakim Langner gave a brief report for the WG chair, Markus Meier, who was unable to attend. The WG had a meeting in Hamburg on 23 September 2008; see the meeting minutes attached in Appendix 6. Joakim noted that most of the WG members are heavily involved in the preparation and organisation of the 2nd Lund Regional-scale Climate Modelling Workshop, scheduled for 4 to 8 May 2009 in Lund, Sweden. The WG is also writing a joint paper for the workshop on the added value of RCMs, where the focus will be on the Baltic Sea region and on coupling to impact models. In a series of 7 presentations given at the WG meeting, WG members have prepared for the joint paper by identifying a number of key aspects relevant for the RCM's added value, see topic 3 of the WG meeting minutes attached. The WG has also summarized present RCM activities at the participating institutions, including SMHI, MPIfM, DMI and GKSS.

In the subsequent discussion the suggestion to explore the suitability of the weather radar data set available at BRDC (see topic 2.2.1 above) for RCM validation was re-enforced, and the WG was asked to contact Jarmo Koistinen to explore related options, see action item 5 under topic 2.2.1. Also, action item 2 (topic 1.3) was re-enforced with regard to the 2nd RCM workshop scheduled for Lund in May 2009.

2.2.4 Working Group on Data Management

In his presentation (see Appendix E3), Michael Lautenschlager, chair of the BALTEX Working Group on Data Management (BWGD), concentrated on two topics:

i) the present status of the BALTEX data centres, and
ii) a planned funding proposal to enhance the BALTEX data centre function.

Michael recalled the decision approved by the BSSG in 2006, to re-shape the BALTEX data management by gradually substituting the existing specific BALTEX data centres structure, which originated from requirements of the early periods in BALTEX Phase I, by a more modern approach, where several existing data archives and centres shall be linked together in an internet-based "one-stop-shop" approach. The former BALTEX Meteorological Data Centre had been included in the WDCC-CERA[1] archive at MPIfM, Hamburg, Germany already in 2003. Subsequently, several other data bases with relevance for BALTEX research were linked to the BALTEX data portal (http://www.baltex-research.eu/data/data_links.html), and information on data contents and access procedures are now displayed at the BALTEX data portal. Examples include the above mentioned WDCC, the IPCC data distribution centre, the CEOP data web-portal, ENSEMBLES data distribution website, the EUMETNET-financed UNIDART system, several regional national services-based data centres for oceanographic observations, and the Global Runoff Data Centre.

Further to the above, the WG developed a project idea for a *Baltic Sea Region Climate Data Network* (BSR-CLIDANET). The core objective is to further advance and complete the "one-

[1] World Data Centre for Climate - Climate and Environmental Retrieval and Archive

stop-shop" data strategy and establish a 4-dimensional data set for northern Europe fulfilling requirements of both research and relevant stakeholders. A related funding proposal is planned to be submitted as a response to the 2nd call of the Baltic Sea Region Programme 2007-2013. The BSR-CLIDANET data network will focus in its initial phase on data from atmosphere, ocean and the land-ocean interface. The central data product will be a state-of-the-art reconstruction of the Baltic Sea Region climate for the past 40 years using existing forcing data and operational numerical models. At present, the project consortium consists of 8 parties from 4 countries, additional parties particularly stakeholders may enter the consortium prior to submission deadline, which is at the end of March 2009. The core CLIDANET proposal group consists of Michael Lautenschlager (WDCC-MPI), Berit Arheimer (SMHI) and Andreas Lehmann (IFM-GEOMAR). The group will explore to what extent HELCOM may be willing to support the application in a relevant and mutually beneficial manner.

BSSG thanked Michael for his report and acknowledged the activities of the WG. BSSG particularly endorsed the planned funding proposal BSR-CLIDANET. BSSG re-enforced action item 1 (see at topic 1.3) as a continuous action item for the WG and the BALTEX Secretariat. The BSSG chair will participate in a meeting of the core CLIDANET proposal group with the HELCOM Secretariat on 14 January 2009.

Joakim brought a request of SMHI to the attention of the BSSG regarding the use of BALTEX data in the context of the **WMO (World Meteorological Organization) Regional Climate Centres** for the Region RA VI (Europe and surroundings). A free access to BALTEX data via WMO data centres would be beneficial for the use of BALTEX data, and thus the programme at large. While BSSG generally acknowledged the free access to BALTEX data via other data centres, the actual BALTEX data policy was also mentioned which – in short – requests BALTEX data users to firstly be registered at the BALTEX Secretariat prior to receiving data. It was also noted that the current BALTEX data policy is in place since the start of BALTEX and had been implemented in response to requirements of data providers, particularly national Services, which – at that time – would not have agreed to a fully free and unrestricted data access. BSSG encouraged Joakim and SMHI to explore further the situation with regard to the national Services and undertake necessary action to allow an unrestricted and free data access as possible to BALTEX data for other data centres such as WMO Regional Climate Data Centres.

2.2.5 Working Group on BALTIC GRID

Michael Lautenschlager, on behalf of the BALTIC GRID chair Andreas Lehmann, briefly stated that the BALTIC GRID activities have been at low profile recently. The funding proposal COFFEX submitted to the BONUS+ call in 2008 had unfortunately been rejected. Some aspects of the above outlined new BSR-CLIDANET proposal are designed to contribute to meeting BALTIC GRID objectives; the new proposal is therefore qualified as a partial contribution to BALTIC GRID and the activities of this WG.

2.3 Report of the BALTEX Secretariat

Hans-Jörg Isemer reported on major activities of the International BALTEX Secretariat (IBS) during 2008, as follows:

1. After the publication of the BACC book in January 2008, the IBS was heavily involved in various BACC book "aftermath" activities such as press releases, responses to the latter as well as monitoring the resonance, which the book has created in both the science

communities and the public (see related statistics in Appendix 4). IBS was involved in publishing further articles on BACC as well as giving presentations both orally and as poster. Springer stated in early January 2009, that the BACC book is also a seller success: The 1st book edition (600 copies) has been sold out within less than a year and another 150 copies were recently printed.

2. Another major part of the IBS activities in 2008 focussed on the preparation of in total five BALTEX events, of which one was already conducted in 2008, three are planned for conduction in 2009, and one for 2010:

- The TELLUS - BALTEX Workshop on *Biogeochemical Land and Baltic Sea Interactions driven by Climate and Land Use,* held 1 and 2 December 2008 at University of Gothenburg, Sweden. IBS was a key driving agent in the organisation of the workshop. For details see Appendix E4 and the BALTEX website at www.baltex-research.eu/TellusBaltex/.

- The 2nd International Lund RCM Workshop on *21st Century Challenges in Regional-scale Climate Modelling,* to be held 4 - 8 May 2009 at Lund University, Sweden. The target communities of this workshop are globally distributed, the expected number of participants is of order 200. Preparations are as scheduled with the abstract submission and registration deadlines planned for the 15th of February 2009 and 15th of March 2009, respectively. The involvement of the IBS, and BALTEX in general, is largely through the activities of members of the BALTEX WG on the Utility of Regional Climate Models. The IBS is contributing major organisational support, including the maintenance of the workshop website and printing and distribution of the 1st and 2nd workshop announcements, respectively. Details are to be found in Appendix E4 and at the BALTEX website via www.baltex-research.eu/RCM2009/.

- The International Conference on *Climate Change – The environmental and socio-economic Response in the southern Baltic region*, to be held 25 - 28 May 2009 at Szczecin University, Poland. Key organizers of the conference include Profs. Andrzej Witkowski and Jan Harff at Szczecin University, in cooperation with Hans von Storch (GKSS), the Helmholtz-Zentrum Potsdam - Deutsches GeoForschungs Zentrum (GFZ) and the Landesamt für Umwelt, Naturschutz und Geologie, Mecklenburg Vorpommern (LUNG). Preparations are as scheduled with the abstract submission and registration deadlines planned for the 15th of February 2009 and 15th of April 2009, respectively. Details are to found in Appendix E4 and at www.baltex-research.eu/SZC2009/.

- An International Summer School on *Climate impacts on the Baltic Sea - From science to policy*, planned for 27 July – 7 August 2009 in Nexø, Bornholm, Denmark; for details see Appendix E4.

- The 6th International Study Conference on BALTEX planned for 2010. See more details at topic 6 of these minutes and in Appendix E4.

BSSG expressed its satisfaction on the numerous BALTEX events and noted the importance for the outreach and visibility of the BALTEX programme. BSSG mandated the IBS to follow-up with necessary preparations, as appropriate and required, thereby re-enforcing related action items, see topics 1.3 and 6 of these minutes.

3. Work towards a *BALTEX outreach web site for the general public* made progress. Access to the draft website was made available to BSSG members prior to this meeting. This outreach website has been designed and established by Marcus Reckermann at IBS so far. The present development is at a stage where further professional input related to the contents of the website is required. Much of the needed input is on both science and background knowledge related to the catchment of the Baltic Sea and the sea. The Annexes of the recently published BACC book were considered as one useful source of input and IBS was encouraged to continue work on the website with support of BACC book annex authors, as appropriate. It was further suggested to launch the new BALTEX outreach website parallel to the existing BALTEX homepage, with cross-linkages whenever possible.

Action Item 5 to Marcus Reckermann and the BALTEX Secretariat to finalize a draft version of a *BALTEX outreach website for the public* in cooperation with authors of the BACC book annexes, BSSG members, and others, as appropriate, and launch the new website subsequently in parallel to the existing BALTEX homepage.

4. Printed materials published and delivered by the IBS during 2008 included 2 BALTEX Newsletters, 4 announcements for BALTEX events (see above), a BALTEX flyer and one issue of the IBS report series. IBS staff members participated at 13 international events including active participation (*e.g.* through organisation, presentation *etc*) at 8 events, see Appendix 7. Support was given to the three funding proposals submitted to BONUS. Communication including reporting to GEWEX/CEOP as well as other international relevant programmes and organisations is a continuous activity at IBS, as is the maintenance of the BALTEX website including dedicated event-related websites, see above.

5. Hans-Jörg closed his report by recalling two major international conferences in 2009 with particular reference for BALTEX:

6th International Scientific Conference on GEWEX
24-28 August 2009, Melbourne, Australia; Abstract submission deadline: 15 March 2009
to be held in conjunction with the 3rd Annual CEOP meeting, 19-21 August 2009.

7th Baltic Sea Science Congress
17-21 August 2009, Tallinn, Estonia; Abstract submission deadline: 16 February 2009.

With regard to the two latter events, BSSG mandated IBS to promote active participation of BALTEX scientists at both conferences.

The IBS report was well taken by BSSG, which appreciated the actions of IBS as an important positive contribution to the overall status and development of the BALTEX programme.

TOPIC 3: BALTEX and BONUS

3.1 Overview on BONUS+ developments

Jüri Elken briefed the BSSG on the actual status and future plans of BONUS. Jüri is currently vice-chair of the BONUS EEIG Steering Committee and a member of BONUS Strategy Implementation Task Force (SITF). Only key information is summarized here, more details may be found in Appendix E5.

Jüri started outlining the overall BONUS activities, which are composed of 3 development stages: BONUS ERA-NET (2004-2008), BONUS+ (2007-2011) and BONUS-169 (2011 and beyond). With 16 funded projects started in January 2009, a major step of the BONUS+ joint call towards collaboration of national funding agencies was reached. The funded projects cover most of the thematic priorities of the BONUS-169 science plan.

At present, BONUS is making steps towards developing into a future funding mechanism according to article 169 of the EU Treaty, BONUS-169. Steps in this direction included the foundation of a BONUS Baltic Organisations Network for Funding Science EEIG (European Economic Interest Grouping) as the dedicated legal structure including the BONUS EEIG Secretariat in Helsinki. The pre-final draft of the BONUS EEIG Action Plan for 2008-2011 outlines the planned actions such as management and clustering of running projects, dialogue with the stakeholders, and the preparation of the first BONUS-169 call in approximately 2011. Jüri explained that several important steps need to be accomplished prior to such a call. The BONUS-169 legislative proposal needs to be developed by the European Commission (EC) and subsequently approved by both the European Council and the European Parliament (EP). A key document in this context is the BONUS-169 strategic research agenda, which was recently pre-evaluated by an external[2] BONUS-169 Impact Assessment Expert Group (IAEG). The IAEG raised some critical issues, which will have to be improved by BONUS prior to approval of BONUS-169 by the EC and EP. One of the critics noted by the IAEG is an apparent limitation of the BONUS-169 plan to marine research only; a "drainage basin" approach for the Baltic Sea appears as not sufficiently developed according to the IAEG's evaluation. Jüri noted that one element in the further development of BONUS-169, also to be seen in conjunction with the above critical comments, will be a *collaborative programming approach* where BONUS intends to closer cooperate with, *inter alia*, other science programmes, including *e.g.* Baltic NEST and BALTEX. The External Advisory Board (EAB) to the BONUS EEIG was recently enlarged to include a representative of BALTEX, and Hans-Jörg Isemer, head of the BALTEX Secretariat, had been nominated as member to the BONUS EAB.

BSSG acknowledged the BONUS developments and expressed its satisfaction on the successful start of the now funded BONUS+ projects. The closer future cooperation between BALTEX and BONUS-169 through the BALTEX representation in the BONUS EAB was particularly appreciated. BSSG members recalled that BALTEX is most probably the only international research programme dedicated by definition to the entire Baltic Sea catchment, including the sea.

3.2 Presentation of BALTEX projects funded by BONUS+

In January 2009, 16 research proposals funded through the BONUS+ mechanism kicked off each for 3 years duration. Two of the 16 projects, BALTIC-C and ECOSUPPORT, are dedicated BALTEX projects. Both projects were presented to the BSSG at the meeting. The material presented is given in Appendices E6 and E7, respectively. Below, only a short summary is given.

3.2.1 Building predictive capability regarding the Baltic Sea organic/inorganic carbon and oxygen systems (Baltic-C).

Coordination: Anders Omstedt, University of Gothenburg, Sweden.
The project was presented by Bernd Scheider.

[2] to BONUS; the IAEG was set up by DG Research.

Baltic-C will for the first time constrain the organic and inorganic carbon budgets of the Baltic Sea addressing Carbon fluxes from land, the exchange fluxes with the atmosphere and the sediments as well as addressing internal Carbon fluxes in the water bodies of the major basins. Only such holistic description of all Carbon fluxes will allow scenario analyses on possible impacts of eutrophication, climate change and acidification. Baltic-C will develop and apply a new integrated ecosystem model framework based on the cycling of organic carbon and carbon dioxide in the Baltic Sea water, drainage basin, atmosphere, and sediments.

Objectives of Baltic-C include:

1. to achieve significant progress in marine ecosystem modelling by aligning biomass production and oxygen depletion with CO_2 dynamics;
2. to provide the first comprehensive integrated assessment of the potential effects of climate change, eutrophication, increasing atmospheric CO_2 concentration, and acidic deposition on carbon cycling in the Baltic Sea and its catchment area.

The work plan includes the following steps:

- implementation of CO_2 chemistry as part of an existing and well-established Baltic Sea numerical model;
- linking models of the terrestrial carbon cycle and weathering regimes with a hydrological model to describe river carbon runoff to the Baltic Sea model;
- characterizing the Baltic CO_2 system and organic carbon inventories using existing data, data from dedicated research vessel cruises, and data gathered by new automated measurement systems on a voluntary observation ship (VOS);
- a river mouth programme (using new and existing data) to quantify the inputs of alkalinity (AT), total CO_2, organic carbon, and nutrients;
- measuring CO_2 air–sea fluxes at an existing field station to improve the parameterization of the gas exchange transfer velocity;
- use data from the EMEP long-range atmospheric pollutant transport model to estimate the acid and nutrient deposition in the Baltic Sea and its drainage basin; and
- investigate several available transient scenario runs covering the 1960–2100 period.

Participants in Baltic-C:
Anders Omstedt, University of Gothenburg, Department of Earth Sciences, Sweden; Bernd Schneider, Baltic Sea Research Institute (IOW), Germany; Matti Perttilä, Finnish Meteorological Institute, Finland; Janusz Pemkowiak, Institute of Oceanology Polish Academy of Sciences, Poland; Anna Rutgersson, Uppsala University, Department of Earth Sciences, Sweden; Christoph Humborg, Stockholm University, Sweden; Benjamin Smith, Lund University, Dept of Physical Geography and Ecosystems Analysis, Sweden.

Baltic-C is a key contribution to meet the 4th major objective of BALTEX Phase II.

3.2.2 Advanced modelling tool for scenarios of the Baltic Sea ecosystem to support decision making (ECOSUPPORT).

Coordination: Markus Meier, SMHI, Sweden.
The project was presented by Berit Arheimer.

The response of the marine ecosystem during the 21st century depends on several, partly competing drivers, like expected reduced phosphorus and nitrogen loads, increased water temperatures, and reduced salinities. Thus, presently discussed targets for nutrient load reductions that may be sufficient to improve the ecological status in present climate might fail

under future climate conditions. The proposed project ECOSUPPORT combines the assessments of various drivers to promote an ecosystem approach to the management of human activities. The **main aim** of ECCOSUPPORT is to provide a multi-model system tool to support decision makers. The tool is based upon scenarios from an existing state-of-the-art coupled atmosphere-ice-ocean-land surface model for the Baltic Sea catchment area, marine physical-biogeochemical models of differing complexity, a food web model, statistical fish population models, economic calculations, and new data detailing climate effects on marine biota. The **expected outcome** is an advanced modelling tool for scenario simulations of the whole marine ecosystem that can underpin and inform management strategies to ensure water quality standards, biodiversity and fish stocks

The ECOSUPPORT Objectives are

1. to calculate the combined effects of changing climate and changing human activity (nutrient load reductions [runoff and airborne], coastal management, fisheries) on the Baltic Sea ecosystem,
2. to assess the resulting socioeconomic impacts,
3. to perform time-dependent scenario simulations from present climate until 2100, and quantify the uncertainties around these future projections,
4. to support decision makers and stakeholders with a tool providing them with relevant and readily accessible information that will help to raise wider public awareness,
5. to conduct focused assessments of local-scale impacts of changing climate on coastal areas (with focus on the Gulf of Finland, Vistula Lagoon, and the Polish coastal waters).

ECOSUPPORT participants: Markus Meier, Swedish Meteorological and Hydrological Institute (SMHI), Sweden; Thorsten Blenckner, Baltic Nest Institute, Resilience Centre, Stockholm University (BNI), Sweden; Boris Chubarenko, Atlantic Branch of P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences (ABIORAS), Russia; Jonathan Havenhand, Tjärnö Marine Biological Laboratory (TMBL), Göteborg University, Sweden; Brian MacKenzie, Technical University of Denmark, Danish Institute for Fishery Research (DTU), Denmark; Thomas Neumann, Baltic Sea Research Institute Warnemünde (IOW), Germany; Jan-Marcin Weslawski, Institute of Oceanology Polish Academy of Sciences (IOPAS), Poland; Urmas Raudsepp, Marine Systems Institute at Tallinn University of Technology (MSI), Estonia; Tuija Ruoho-Airola, Finnish Meteorological Institute (FMI), Finland; Eduardo Zorita, GKSS-Research Centre Geesthacht GmbH (GKSS), Germany; Björn-Ola Linnér, Center for Climate Science and Policy Research (CSPR), Linköping University, Sweden.

ECOSUPPORT contributes to meeting BALTEX Phase II objectives 2, 3 and 4. It is considered as one of the most ambitious research projects within BONUS+.

3.3 BALTEX and BONUS-169

Much of the relevant discussion to this topic was already merged with topic 3.1. BALTEX will be represented in the future BONUS-169 EEIG Advisory Board. Hans-Jörg Isemer, head of the BALTEX Secretariat, received a related invitation recently. The next Board meeting will be held 15 January 2009. Hans-Jörg will brief the BSSG on relevant developments of the Advisory Board in due time.

TOPIC 4: Options for future BALTEX cooperation

4.1 BSSSC, Baltic Sea States Subregional Cooperation

Dr. Jan Thiele, staff member of the BSSSC Secretariat, introduced BSSSC and its key priority themes. BSSSC, founded in 1993, is an open political network of more than 100 regions in 10 countries of the Baltic Sea Region (BSR, see map in Annex E7)[3], operating under the umbrella of the Council of the Baltic Sea States (CBSS). Key objectives of BSSSC include the promotion of cooperation among subregions around the Baltic Sea, to formulate a coherent Baltic Sea policy on the regional level and to represent the interests of the subregions towards national, European and international organisations. The main organisational bodies of BSSSC are the Chairman, chosen by the Board on a rotational basis for a two year period, the Board as the decision making body consisting of two representatives of each country, and the Secretariat which is linked to the Chairman. The City of Hamburg assumed chairmanship of BSSSC for 2009 and 2010 through Carsten Lüdemann, State Secretary and Commissioner for Federal, European and International Affairs of Hamburg. Hamburg is therefore now also operating the BSSSC Secretariat during these two years.

Dr. Thiele pointed out that *climate change and sustainable development* is among the key areas of BSSSC and is planned to be a focal point under the Hamburg chairmanship. He mentioned the establishment of the Baltic Sea Region Joint Platform on Energy and Climate which several organisations are a member to, including BSSSC, the Baltic Development Forum (BDF), the Union of Baltic Cities (UBC), and the Baltic Islands Network B7. He continued by detailing BSSSC's foci, actions and prospects for activities related to *climate change and sustainable development* (see Annex E7 for details). In the frame of the current climate debate a close interaction between political decision makers and climate researchers is mandatory, and the BALTEX programme, particularly the BACC initiative, is seen as a prominent candidate for future cooperation in the above context. In closing his presentation Dr. Thiele indicated Hamburg's openness to discuss future cooperation options.

A lively discussion emerged around a number of themes. BSSG members noted the need to discuss climate change not only in the context of *mitigation*, but relate climate change more closely to *adaptation*. This would be particularly appropriate for actors and decision makers responsible at the regional to local scales. Despite of all mitigation efforts, it appears obvious that climate change is already ongoing in the Baltic Sea Region and that at least part of the projected future climate changes (as, for example, assessed in the BACC report) will inevitably materialize. Ignoring or delaying adaptation measures could be non-sustainable and, thus, dangerous. Another theme discussed with emphasize was on how regional decision makers, e.g. exemplified by BSSSC members, have access to assessed knowledge on climate issues as a sound and easily interpretable basis for decision making. Is the bridge between science experts and decision makers properly established and how are - if at all – advisory mechanisms established in the BSR countries with special emphasize on the regional rather than the national or international levels? Examples from Sweden, where SMHI as one central organisation provides for regional advice, and Germany, where various organisations, including regional climate offices, are in place since recently were noted. As an ad-hoc idea for a possible joint initiative of BSSSC and BALTEX, it was suggested to 1) establish a survey on how deliberation on regional climate change for regional decision makers is organised in the countries around the Baltic Sea, and 2) based on the outcome of this survey,

[3] Denmark, Norway, Sweden, Finland, Russia, Estonia, Latvia, Lithuania, Poland, Germany

establish a relevant mutually beneficial exchange of experience among the individual national or regional "regional climate advisors". If the suggested survey would uncover a serious gap in the knowledge transfer between science experts and decision makers, means should be explored to close this gap. As a concrete event where a dialogue between BSSSC representatives and climate experts may materialize (*e.g.* as a jointly organized workshop), this year's annual BSSSC conference scheduled for October 2009 in Ringstedt, Denmark, was mentioned. Also, one of the BSSSC Board meetings may be used to intensify the BALTEX-BSSSC dialogue.

Action Item 6 to Hans von Storch and the BALTEX Secretariat to continue interacting with BSSSC, particularly the BSSSC Secretariat, with the view to contribute to organizing a close cooperation between BALTEX and BSSSC in the fields of adaptation to climate change and improving climate experts – regional decision makers interactions.

On behalf of the BSSG the Chairman thanked Dr Thiele for attending this meeting and expressed again the BSSG's positive attitude towards a closer future cooperation of BALTEX and BSSSC along the lines initially discussed at this meeting.

4.2 ESSP, Earth System Science Partnership

Hans-Jörg Isemer briefed the BSSG on the Earth System Science Partnership (ESSP, see at www.essp.org), the joint initiative of WCRP, IGBP, DIVERSITAS and IHDP. He particularly noted that ESSP is currently developing a small set of *Integrated Regional Studies* (IRS), which are designed to contribute sound scientific understanding in support of sustainable development at the local level. These studies are also expected to improve overall knowledge of regional-global linkages in the context of Earth System dynamics. Presently, only one IRS has successfully passed the ESSP approval mechanism. BALTEX had been mentioned previously as a possible candidate for an ESSP-ISR, and the Secretariat had had contact to the ESSP coordination office to explore details on related requirements and procedures. It was pointed out that a key requirement for IRS is the obvious active contribution to all, or at least 3 out of the 4 global change programs. Hans-Jörg also noted the outcome of the recently conducted review by ICSU/IGFA, which suggested strengthening ESSP by several actions, e.g. the establishment of a long-term vision plan concerning science topics, management and capacity building approaches.

BSSG members expressed different views, both in favour and against starting an attempt for BALTEX to be approved as an IRS within ESSP. A realistic evaluation of current BALTEX activities would certainly identify contributions to WCRP and IGBP, however, contributions to DIVERSITAS and IHDP are presently not on the agenda of BALTEX. As a conclusion, based on majority opinion, BSSG took the view to further observe the near-future development of ESSP, and reconsider the ESSP-IRS option at a later BSSG meeting, if appropriate.

Action Item 7 to the BALTEX Secretariat to follow ESSP developments and report accordingly at forthcoming BSSG meetings.

4.3 Future of BALTEX beyond 2012 and other global programmes

A short discussion followed on the actual and possible future profile of BALTEX, also beyond 2012. A decision on whether to close BALTEX in 2012 or to continue the programme

should be taken after a thorough evaluation of BALTEX Phase II achievements. Such a decision shall further consider the present and future (to the extent visible) environmental research needs relevant for the Baltic Sea Basin and plans of other regional relevant initiatives and programmes. The recently approved Baltic Sea Action Plan as well as BONUS-169 was mentioned as prominent examples. Another aspect discussed, to some extent as a follow-up of topic 4.2 above, was the "landscape" of global programmes and their objectives and time planes for the period beyond 2010. In terms of identifying other[4] relevant global programmes where BALTEX contributes actively to, LOICZ (a core project of both IGBP and IHDP) and iLEAPS (a core project of IGBP) were mentioned as example candidates. It was also suggested to not limit active BALTEX linkages to only the four global change programmes but consider a closer interaction with and contribution to other initiatives such as the International Association of Hydrological Sciences (IAHS) or the FRIEND (Flow Regimes from International Experimental and Network Data) programme.

The BSSG asked the Secretariat to monitor relevant global programmes and initiatives with possible relevance for BALTEX. All BSSG members accepted an action item to begin making initial plans on a role and profile of a potential follow-up programme to BALTEX beyond 2012.

Action Item 8 to the BALTEX Secretariat and all BSSG members to monitor running global and regional programmes and projects regarding their overlap with BALTEX Phase II objectives.

Action Item 9 to all BSSG members to begin developing ideas and making initial plans on the role and profile of a potential follow-up programme to BALTEX beyond 2012.

TOPIC 5: Concluding discussion on revised BALTEX Phase II objectives

Joakim introduced this topic by recalling that a discussion on updates of the BALTEX Phase II science and implementation plans published in 2004 and 2006, respectively, had been initiated at the previous BSSG meeting. The discussion had been continued in various forms throughout 2008, and at this meeting, BSSG should conclude on a final plan on updating the BALTEX Phase II objectives.

A draft revision working paper demonstrating the status prior to this meeting was distributed to meeting participants. The paper included objectives, goals and potential activities taken from the BALTEX Phase II science and implementation plans plus suggested changes and additions inserted in the document. A second document submitted by Bernd Schneider contained a significantly revised version for objective 4, where a strong focus on the biogeochemistry in Baltic Sea was suggested and where the inclusion of the biogeochemistry in the catchment was confined to processes that affect the Baltic Sea. This was the obvious difference to the present version. Participants were assigned to two ad-hoc working groups, both of which had the objective to review both documents and report to plenary accordingly.

The subsequent reporting and discussion in plenary revealed two document versions with differences still existing particularly with objectives 3 and 4. It was concluded that the remaining discrepancies shall be edited after the meeting by the BSSG chairs and the Secretariat with the help of selected BSSG members, including Bernd Schneider. Final editing and conclusion shall be done by e-mail during 2009 rather than waiting for the subsequent

[4] than WCRP and its programmes and projects such as GEWEX and CEOP

BSSG meeting sometime in late 2009 for final decisions. Two further necessary steps may include the final adjustment of the full text of the goals and potential activities and a decision on how to publish the revised objectives of BALTEX Phase II. Options for the latter discussed include the publication of a fully revised *BALTEX Phase II science and implementation plan 2009 – 2012* or a supplementary shorter document containing a shorter description and related rational of the changes compared to the present plan. The decision on the latter was left for the final writing and editing team.

Action Item 10 to the BSSG Chair and vice-chairs, selected BSSG members and the BALTEX Secretariat to i) finally edit the revised BALTEX Phase II objectives, goals and potential activities, ii) to finalize editing necessary text related to the changes in objectives, goals and potential activities, iii) decide on a suitable publication of the revised BALTEX Phase II objectives, and iv) iterate for approval with the whole BSSG on i) to iii) as appropriate.

Note to the minutes: The BSSG chair and vice-chairs approved a consolidated version of the BALTEX Phase II objectives on 9 March 2009, see Appendix 8. The document is still at the headline level and requires further editing with respect to the full text, as indicated under action item 10.

TOPIC 6: 6th International Study Conference on BALTEX 2010

Hans-Jörg Isemer and Janusz Pempkowiak summarized the preparation status which evolved after a visit in May 2008 to the island of Wolin and the candidate hotel. The Amber Baltic Hotel located in Międzyzdroje, island of Wolin, appears to offer all necessary facilities to host a conference with up to 150 to 200 participants. Preliminary negotiations with the hotel management revealed that the overall financial conditions would allow the conduction of the 6th International Study Conference on BALTEX with appropriate participants' conference fees, see Appendix E4 for some details.

A majority vote by BSSG members prior to this meeting indicated 7 – 11 June 2010 as the most appropriate time for the conference.

Note to the protocol:
*After the BSSG meeting, in April 2009, the BALTEX Secretariat was notified on a date conflict for the 6th Study Conference on BALTEX with the "Polar Science – Global Impact" Conference scheduled for 8 to 12 June 2010 in Oslo, Norway. In subsequent communications, the BSSG decided to re-schedule the 6th International Study Conference on BALTEX to be conducted during **14 – 18 June 2009**.*

DECISION 2 (amended in May 2009): The 6th International Study Conference on BALTEX shall be conducted during **14 to 18 June 2010** in Międzyzdroje, island of Wolin, Poland.

Key preparatory actions for 2009 will be the publication of the first Conference announcement before the 2009 summer break (tentative date June 2009) and also the second announcement including the call for abstracts with more detailed information on the Conference, tentatively planned for November 2009. The 1st Conference announcement shall allude in a broad manner to all BALTEX Phase II objectives. Cooperation with other

programmes for the conduction of the conference was strongly supported by BSSG members; candidate programmes mentioned include BONUS, LOICZ and NEESPI. The initial conference committee shall be composed of BSSG members with an adequate additional membership from programmes or institutions acting as conference co-organizers and/or sponsors. The key national organizer in Poland will be the Institute of Oceanology in Sopot (IOPAS) represented by BSSG member Janusz Pempkowiak. Janusz will explore other Polish institutions' preparedness to co-organize the Conference, *e.g.* the national Institute for Meteorology and Water Management (IMGW), the Research Centre of Agriculture and Forest Environment PAS in Poznan or a further university in Poland.

Action Item 11 to the BALTEX Secretariat and Janusz Pempkowiak to continue preparations for the 6th Study Conference on BALTEX in 2010 along the lines discussed at this meeting.

TOPIC 7: Place and timing of next BSSG meeting

The following two options were discussed and will need to be further elaborated and agreed upon after this meeting.
Option 1:
Riga, Latvia, calendar week 46 or 47 (within 9 to 20 November 2009). The possible host will be identified by BSSG member Andris Andrusaitis.
Option 2:
If option 1 fails to be organised, Warnemünde in Germany is option 2. In this case, BSSG member Bernd Schneider will act as the local host of the meeting at IOW.

Action Item 12 to the BALTEX Secretariat to clarify time and location of the next BSSG meeting and communicate to BSSG members accordingly in due time.

TOPIC 8: Any other business

None

Some Abbreviations and Acronyms

BACC	BALTEX Assessment of Climate Change for the Baltic Sea basin
BALTEX	The Baltic Sea Experiment
BALTIC GRID	A network to share expertise and data in BALTEX
BALTRAD	BALTEX Radar Network, also project funded through INTERREG-IV
BDF	The Baltic Development Forum
BNI	Baltic Nest Institute
BONUS	Baltic Organisations Network for Funding Science EEIG
BRDC	BALTEX Radar Data Centre
BSR-CLIDANET	Baltic Sea Region Climate Data Network
BSSG	BALTEX Science Steering Group
BSSSC	Baltic Sea States Subregional Co-operation
BWG	BALTEX Working Group
BWGD	BALTEX Working Group on Data Management
BWGR	BALTEX Working Group on Radar
BWRW	Baltic Weather Radar Workshop
CBSS	Council of the Baltic Sea States
CEOP	Coordinated Energy and Water Cycle Observations Project
COFFEX	Coastal and offshore exchange processes
DAAD	German Academic Exchange Service
DIVERSITAS	An international programme of biodiversity science
DOC	Dissolved Organic Carbon
DTU	Danish Technical University
DWD	German Weather Service
EAB	External Advisory Board
EC	European Commission
ECOSUPPORT	Advanced tool for scenarios of the Baltic ECOsystem to SUPPORT decision making
EEIG	European Economic Interest Grouping
ENSEMBLES	Ensemble prediction systems for climate change (FP6 project)
EP	European Parliament
ESSP	Earth System Science Partnership
EUMETNET	The Network of European Meteorological Services
EurOceans	FP6 Network of Excellence on Research on Ocean Ecosystems
FMI	Finnish Meteorological Institute
FIMR	Finnish Institute of Marine Research
FRIEND	Flow Regimes from International Experimental and Network Data
GEWEX	Global Energy and Water Cycle Experiment
GFZ	Helmholtz-Zentrum Potsdam – Deutsches GeoForschungs Zentrum
GKSS	GKSS Research Centre Geesthacht, Germany
HELCOM	Helsinki Commission
IAHS	International Association of Hydrological Sciences
IAEG	Impact Assessment Expert Group
IBS	International BALTEX Secretariat
ICSU	International Council for Science
IFM GEOMAR	Leibniz-Institute for Marine Sciences, Kiel
IGFA	International Group of Funding Agencies for Global Change Research
IGBP	International Geosphere-Biosphere Programme
IHDP	International Human Dimensions Programme on Global Environmental Change
IMGW	Institute for Meteorology and Water Management, Poland
INTERREG	Community initiative to stimulate interregional cooperation in the European Union
IOPAS	Institute of Oceanology Polish Academy of Siences
IOW	The Leibniz Institute for Baltic Sea Research Warnemünde
IPCC	Intergovernmental Panel on Climate Change
IRS	Integrated Regional Studies
LOICZ	Land Ocean Interactions in the Coastal Zone
LUNG	Landesamt für Umwelt, Naturschutz und Geologie, Mecklenburg Vorpommern
MPIfM	Max-Planck-Institut für Meteorologie, Hamburg, Germany

MSI	Marine Systems Institute at Tallinn University of Technology
NEESPI	The Northern Eurasia Earth Science Partnership Initiative
NORA	Nordic Co-operation
NORDMET	Nordic co-operation in meteorology
PAS	Polish Academy of Sciences
RCM	Regional Climate Model
SITF	Strategy Implementation Task Force
SMHI	Swedish Meteorological and Hydrological Institute
SSC	Science Steering Committee
SSG	Science Steering Group
SYKE	Finnish Environment Institute
TELLUS	The Centre of Earth Systems Science at Göteborg University
UBC	The Union of Baltic Cities
UNIDART	Uniform Data Request Interface
WCRP	World Climate Research Programme
VOS	Voluntary observation ship
WDCC-CERA	World Data Centre for Climate-Climate and Environmental Retrieval and Archive
WG	Working Group
WMO	World Meteorological Organization

Appendix 1: Workshop and Meeting agenda

23rd BALTEX SSG Meeting

Hosted by

Finnish Meteorological Institute (FMI)
Dynamicum, Erik Palmenin aukio 1
Helsinki, Finland

12 – 14 January 2009

PROVISIONAL AGENDA AND EXPLANATORY MEMORANDUM

(as of 9 January 2009)

The BSSG meeting will start with a Workshop entitled **Winters with reduced snow and sea ice: Probability of occurrence and implications in the Baltic Sea catchment area** scheduled to take place on Monday afternoon, 12 January 2009. See the speakers' list at the end of the agenda.

The **business part of the BSSG meeting** will begin in the morning of Tuesday, 13 January (Day 2 of the meeting) and is scheduled to be concluded at noon on Wednesday, 14 January 2009. A key topic of this meeting is to finally discuss and decide on updates of the BALTEX Phase II science and implementation plans published in 2004 and 2006, respectively. The discussion had been initiated at the previous BSSG meeting in 2008 and has been continued in various forms throughout 2008. Further topics include discussions on options for intensifying relations to other organisations such as the Baltic Sea States Subregional Cooperation (BSSSC) and the Earth System Scince Partnership (ESSP). The recent outcome of the BONUS+ call with 16 new projects retained for funding and the future cooperation between BONUS-169 and BALTEX will be summarized and discussed in detail.

Day 1: Monday, 12 January 2009

14:00 **BALTEX Workshop**
„Winters with reduced snow and sea ice: Probability of occurrence and implications in the Baltic Sea catchment area"

A series of presentations will allude to observational evidence on past variability and trends as well as to projections related to snow and sea-ice in the Baltic Sea catchment and possible implications for marine and terrestrial ecosystems, as well as the society.

Chair and Organisation: Timo Vihma, FMI
See separate agenda.

18:30 **Closing of Workshop**

Day 2: Tuesday, 13 January 2009

9:00 **Welcome by the host and the Chairman**

TOP 1: Organisational issues
1.1 Approval of the agenda
1.2 Approval of the previous BALTEX SSG meeting minutes
1.3 Review of previous BALTEX SSG meeting action items
1.4 BALTEX SSG and Working Group Membership changes

9:30 **TOP 2: Status of BALTEX Phase II Implementation and Achievements**

2.1 Report of the BSSG Chairman (J. Langner)
Activities in 2008 and prospects for 2009
This overview report is planned to include national reports by all BSSG Members, which will be collected and consolidated into one report prior to the BSSG meeting. A written version of the report containing the national contributions is planned to be distributed to meeting participants prior to the meeting.

Indicative time allocated: 60 minutes

Health Break

11:00 **2.2 Working Group Reports**

- Radar (J. Koistinen)
- BACC II (H. von Storch)
- Regional Climate Models (speaker tbd)
- Data, including BALTEX Data Centres Status (M. Lautenschlager)
- BALTIC GRID (M. Lautenschlager)

Indicative time allocated: 90 minutes

2.3 Report of the BALTEX Secretariat (H.-J. Isemer, M. Reckermann)
Activities in 2008, including preparation status of

- RCM Workshop Lund, Sweden, May 2009
- Climate Conference Szczecin, Poland, May 2009
- BALTEX-EUROCEANS summer school, Bornholm, Denmark, August 2009

Indicative time allocated: 30 minutes

13:00 LUNCH

14:00 TOP 3: BALTEX and BONUS

In June 2008, 16 research proposals to the BONUS (Network of Funding Agencies for Baltic Sea Science) programme were retained for funding (see e.g. at www.bonusportal.org). Two of the latter were submitted – and will receive funding - with a dedicated statement as BALTEX projects. At present, BONUS is making steps towards developing into a future funding mechanism according to article 169 of the EU Treaty, BONUS-169. TOP 3 of this meeting will consist of the following 3 parts:

3.1 Overview on BONUS+ developments
(J. Elken)

3.2 Presentation of future BALTEX projects within BONUS+

Building predictive capability regarding the Baltic Sea organic/inorganic carbon and oxygen systems (Baltic-C), coordination: Anders Omstedt
(presented by B.Schneider)

Advanced modeling tool for scenarios of the Baltic Sea ecosystem to support decision making (ECOSUPPORT), coordination: Markus Meier
(presented by B.Arheimer)

3.3 BALTEX and BONUS-169
BALTEX will be represented in the future BONUS-169 EEIG Advisory Board. Hans-Jörg Isemer, head of the BALTEX Secretariat, received a related invitation recently. This topic is expected to discuss and conclude on recommendations or suggestions the BSSG may have related to the future BONUS-169 development.

Indicative time allocated: 60 minutes

Health Break

15:30 **TOP 4: Options for future BALTEX cooperation**

4.1 BSSSC, Baltic Sea States Subregional Cooperation
(Jan Thiele, BSSSC Secretariat, Hamburg, Germany)
The City of Hamburg will assume chairmanship and will operate the BSSSC Secretariat during 2009 and 2010. Climate change and environmental issues are of importance for BSSSC. A close interaction between political decision makers, such as BSSSC, and climate researchers is mandatory, and the BALTEX programme, particularly the BACC initiative, is seen as a prominent candidate for future cooperation in the above context. A representative of the BSSSC Secretariat plans to attend the meeting to introduce future BSSSC directions and discuss possible cooperation options.

4.2 ESSP, Earth System Science Partnership (Hans-Jörg Isemer)
ESSP is a joint initiative of WCRP, IGBP, DIVERSITAS and IDHP, see www.essp.org. A brief overview on ESSP, particularly the Integrated Regional Study option will be given.

Indicative time allocated: 60 minutes

16:30 **TOP 5: Concluding discussion on revised BALTEX Phase II objectives**
(J. Langner)

A key topic of this meeting is to finally discuss and decide on updates of the BALTEX Phase II science and implementation plans published in 2004 and 2006, respectively. The discussion had been initiated at the previous BSSG meeting in 2008 and has been continued in various forms throughout 2008. The Chairman will summarize the actual state of this discussion. BSSG is expected to finally conclude on both the contents of revisions and updates as well as on the means of how to communicate science and implementation plan updates.

18:00 **Closing of Day 2**

Day 3: Wednessay, 14 January 2009

9:00 **TOP 5** ***(continued)***

Summary of yesterday's discussion, final decisions

Indicative time allocated: 90 minutes

Health Break

11:00 **TOP 6: BALTEX Conference 2010**
(J. Pempkowiak, H.-J. Isemer)
The preparation status will be summarized. Directions for the programme of the Conference, composition of the Conference Committee, and further planning details will be discussed and concluded to the extent possible and necessary.

TOP 7: Place and timing of next BSSG meeting

TOP 8: Any other business

13:00 **Closing of the BSSG meeting**

BALTEX Workshop

Winters with reduced snow and sea ice: Probability of occurrence and implications in the Baltic Sea catchment area

12 January 2009
Finnish Meteorological Institute, Helsinki, Finland

Agenda

14.00 – 14.30
Jouni Räisänen: *Probability of occurrence for mild winters*

14.30-15.00
Daniel Hansson and Anders Omstedt: *Has the number of mild winters in the Baltic Sea increased during the last century?*

15.00-15.30
Ari Seinä: *Implications of mild ice winters for operational ice service, ice breaker activities, and other navigation*

15.30-16.00
Harri Kuosa: *Implications of mild ice winters on the ecosystems in the Baltic Sea*

16.00-16.20 Coffee break

16.20-16.50
Raino Heino: *Recent snow cover changes in Northern Europe*

16.50-17.20
Esko Kuusisto: *Recent changes in areal snow water equivalents in Finland*

17.20-17.50
Jouni Pulliainen: *Real-time monitoring and long-term data of snow conditions in the Baltic Sea drainage basin*

17.50-18.20
Bertel Vehviläinen: *Effect of climate change on river discharges*

Appendix 2: Participants of the 23rd BSSG meeting

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German Weather Service, DWD,
Lindenberg Meteorological Observatory
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Tallinn, Estonia

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Geesthacht, Germany

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Sopot, Poland

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Warnemünde, Germany

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Geesthacht, Germany

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Helsinki, Finland

Valery **Vuglinsky** vvuglins@vv4218.spb.edu
State Hydrological Institute,
St. Petersburg, Russia

Appendix 3: CV Berit Arheimer

Curriculum Vitae – Berit Arheimer (Berit Maria Pappila Arheimer) 1

Birth Date: 3 November, 1966 (661103-4049)
Citizenship: Swedish
Languages: Swedish (mother tongue), English (excellent), French (good), Spanish (fair)
Current Employment:
2000-2008
Head of Hydrological Research (incl. 30% research)
Swedish Meteorological and Hydrological Institute (
SE-601 76 Norrköping, Sweden
tel. +46 11 495 82 60, fax: +46 11 495 80 01
E-mail: berit.arheimer@smhi.se

Work Tasks *(since 2000)*:
- Scientific leader of the hydrological research at SMHI, including numerical model development, improved hydrological forecasting, evaluation of climate-change consequences, and water-quality modelling with management scenarios for nutrients.
- Staff responsibility for 18 employees, including planning, coaching and personnel development.
- Strategic development, marketing of the group and application for research funding (internal and external).
- Economic responsibility, including ~70% incomes from external sources, budgets, salaries and continous follow-up.
- Involved in several steering groups for projects on operational hydrology and projects addressing water quality issues, and the SMHI programme to support the work with the EU Water Framework Directive in Sweden.
- Member of the leading group for the SMHI Research Department, working with strategic development on the topics: meteorological forecasting, climate change, atmospheric radiation, satellite interpretation, atmospheric chemical modelling, applied hydrology and oceanography, as well as water related biogeochemistry.

Education/Title:
2007 Associate Professor (Docent) at Linköping University, Sweden.
1999-01-29 Ph. D. in Water and Environmental studies, University of Linköping, Sweden.
1991 B.Sc. in Earth Sciences (Geoscience, Physical Geography, Biology, Chemistry and Environmental Management) at the University of Lund, Sweden.
Doctoral Thesis
Arheimer, B., 1998. *Riverine Nitrogen – analysis and modelling under Nordic conditions.* Kanaltryckeriet, Motala. pp. 200.
Supervisor:
Prof. Ulrik Lohm, *co-supervisor:* Associate Prof. Lotta Andersson

Management Training:
2008 “Conflict resolution” by Gällöfsta Lärocenter, 3 days
2006 “Supervising doctoral candidates” by Linköping University, 2 weeks
2005 “Life and Career development” by Karrär och Kompetens, 10 sessions
2003 “Female leader and boss” by JGKonfenesproduktion, 1 day
2001 “Media training” by profesional journalists, 1 day
2001 “Creativity and development of organisations ” by IPF, 3 days
2001 “UGL (development of groups and leaders)” by Gällöfsta Lärocenter, 5 days
2000 “How to handle difficult persons” by IIR training, 1 day
1993 “Pedagogic introduction” at Linköping University, 5 days.

Previous employements:
2000- Head of Hydrological unit, Research Department, SMHI

1997-1999 Researcher at the Swedish Meteorological and Hydrological Institute (SMHI)
1991-1996 Doctoral Candidate and Research Assistant at the University of Linköping
1980-1991 Various temporal employment within the social care and environment sectors

Maternal leave
1994-1995 12 months maternal leave
1999-2000 12 months maternal leave

Additional Assignments:
2008- Member in the Swedish working group of the UNESCO scientific program, and chair of the Swedish IHP committee.
2007- Member of the management group of Center of Climate Science and Policy Research (CSPR), Linköping University
2007- Vice-president of the International Association of Hydrological Sciences (IAHS) scientific commission on water quality (ICWQ).
2007- Delegate in EU Cost Action No. 869 "Mitigation options for nutrient reduction in surface and groundwater".
2007- Member of the new Swedish national committee of Geophysics (SNG), Royal Swedish Academy of Sciences (KVA)
2006- Swedish representative of the UNESCO/IHP FRIEND initiative (Flow Regimes from International Experimental and Network Data) .
2006- Swedish representative of the Nordic River Basin (NRB) task force on Predictions in Ungauged Basins (PUB)
2006- Member of the Swedish National committee of Geodesi and Geophysics (SNG), Royal Swedish Academy of Sciences (KVA)
2004- Swedish representative of IAHS, which is part of the International Union of Geodesi and Geophysics (IUGG).
2002-2005 Principle Investigator for SMHI participation in the EU-project EUROHARP (EVK1-CT-2001-00096).
2001-2004 Member of the leading group and subprogram leader in the Swedish Water Management Research Programme (VASTRA).
2000 –2001 Swedish expert in the working group MINDEC88 for Helsinki Commission (HELCOM).
1999-2001 Rapporteur for the Word Meteorological Organisation (WMO) working group on hydrology, RA VI (Europe).
1999-2001 Principle Investigator for SMHI participation in the EU-project BALANS (ENV4-CT98-0748 /IC20-CT98-0119).

Other Scientific Records:

- Author of 30 per-reviewed scientific papers in international journals and 50 reports or international conference proceedings (some per-reviewed).
- Presentations of scientific results at some 25 international conferences (some invited).
- Received research grants from Swedish EPA, Swedish Space Board, Municipal Studies Center (CKS), Swedish Strategic Environmental Research Fund (MISTRA), FORMAS, and European Union 4th , 5th and 7th frame programme for research and development.
- Scientific referee for the international journals: e.g. Ambio, Aquatic Sciences, Biogeochemistry, Hydrobiologia, Hydrological Processes, Hydrological Sciences Journal, Nordic hydrology, Journal of Environmental Quality, Journal of Hydrology, Journal of the Total Environment.
- Employed by EU Commission as annual reviewer of the EU project EUROLIMPACS (FP6) regarding work by 57 partners and working plans for additional yrs, 2007-08.
- Reviewer of applications for research grants from by the Swedish Foundation for Strategic Environmental Research (Mistra), Netherlands Organisation for Scientific Research (NWO).
- Member of the scientific committee of conferences:

—— Nordic Hydrologic Conference, 1999, Sweden.

—— 2nd International Symposium on Wetland pollutant dynamics and control, WETPOL,

2007, Estonia.

— 2 nd International Conference of GIS/RS in Hydrology, Water Resources and Environment (ICGRHWE'06) and the 2 nd International Symposium on Flood Forecasting and Management with GIS and Remote Sensing (FM2S'06), 2007, China.

— IAHS scientific assembly in Hyderabad, India, 7-12 sept. 2009.

- Addressed as expert on water quality issues by the Swedish Ministry of Environment and the Swedish Environmental Agency, e.g. in the communication with the European Commission regarding nitrogen discharge from treatment plants and lake retention.
- Member of the Tison Award Judging Panel, 2008 (IAHS).
- Member of the scientific network Baltic sea experiment (BALTEX) Implementation Plan Writing Team, 2004.
- Occational lectures at the Universities, Societies and Authorities (invited).
- Supervisor for Master-degree thesis:

— "Analysis and modelling of organic nitrogen leaching from catchments in northern Sweden" by Johan Andréasson, 2001, Uppsala University School of Engineering. (ISSN 1401-5765).

— "Modelling nitrogen retention in European catchments: comparison of HBV-N and MONERIS" by Sofia Fogelberg, 2003, Uppsala University School of Engineering. (ISSN 1401-5765).

— "Modeling phosphorus transport and retention in river networks" by Jörgen Rosberg, 2003, Uppsala University, Inst. of Geosciences. (ISSN 1650-6553).

- Co-supervisor for doctoral candidates M.Sc. Joakim Riml and M.Sc. Anna Gustafsson at Department of Land and Water Resources Engineering Division of Hydraulic Engineering, at the Royal Institute of Technology, Stockholm, in co-operation with professor Anders Wörman (period: 2007-2011).
- Part of the Dissertation Board:

— Ph.D. María Eugenia García Moreno, 2006: Transport of arsenic and heavy metals to Lake Poopó – Boliva. Natural leakage and anthropogenic effects. TVRL, Lund University.
— Ph.D. Georg Lindgren, 2006: Physical process effects on catchment-scale pollutant transport-attenuation, coastal loading and abatement efficiency, KTH, Stockholm.
— Lic. Jan-Olov Andersson, 2005: A Landscape perspective on the influence of topography and wetlands on headwater stream chemistry in Swedish Boreal forest. Karlstad University.

Appendix 4: National Reports 2008

Appendix 4

BALTEX SSG meeting #23

Helsinki, 13-14 January 2009

National Reports on BALTEX

Reporting period: January to December 2008

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Jüri Elken & Sirje Keevallik**, Country:** Estonia

1. Past year's activities, projects and events

a) Long-term research themes:

Tallinn University of Technology
Marine Systems Institute
Baltic Sea water and matter exchange processes in conditions of changing external forcing
Institute of Cybernetics
Nonlinear dynamics and complex systems

University of Tartu
Institute of Ecology and Earth Sciences
Material cycling of landscapes in changing climate and land use conditions and ecotechnological control thereof
Institute of Physics
Development of the numerical weather prediction towards the forecasting of atmospheric environment
Estonian Marine Institute
Investigation of hydrodynamic processes and their influence on the coastal benthic ecosystem using high resolution modelling and in situ measurements

Tallinn University
Institute of Ecology
Impact of disturbances on wetland ecosystems in Estonia
Tartu Observatory
Remote sensing of optically complex natural environments

Also involved institutions:
Department of Environmental Engineering, Tallinn University of Technology
Estonian Meteorological and Hydrological Institute
Limnology Centre, Estonian University of Life Sciences

b) Projects

Funded by Estonian Science Foundation under category "Earth Sciences" (see www.etis.ee)
- Probable locations of windfarms in the open sea in relation to most favourable meteorological, hydrographical, ice and environmental conditions
- Application of an operational oceanographic model system to study the Baltic Sea large- and mesoscale circulation patterns
- Buoyancy wave dynamics and wave drag in the stratified atmosphere with shear wind
- Cyclones in the Baltic Sea region, their relationship with the general atmospheric circulation and environmental variables in Estonia
- Development of the Baltic Sea coastline in Estonia through time: palaeoreconstructions and predictions for future
- Experimental studies of coastal hydrodynamic processes: coastal jets along the North Estonian coast and wave climate off the Kelba spit
- Formation of the bottom sediments of Lake Peipsi and their palaeolimnological indicativeness
- High-resolution modelling system for aerosol transport and dynamics
- Impact of the bottom topography on the upper sediments lithological composition in Estonian small lakes
- Lateglacial shoreline changes on the uplifting coast of Estonia
- Modeling Radiative Transfer in Vegetation: Enhancement and Validation of the Adding Method

- Occurrence of extreme precipitation and drought in changing climatic conditions in Estonia: reasons of their formation, predictability, and their consequences on water regime of inland water bodies and on living nature
- Past land-use and its impact on terrestrial and aquatic ecosystems
- Real time 0ptical measurements and modelling of wave-induced resuspension of bottom sediments
- Shoaling and runup of long waves generated by high-speed ferries
- Spatial and temporal variability of the Baltic Sea wave fields in changing climatic conditions
- Specification of the optical properties and modal structure of the particle size spectrum of atmospheric aerosol in the Baltic region and enhancement of the measurement precision of the corresponding measuring devices
- The impact of changes in land use and water regime on emission of methane and nitrous oxide from agricultural landscapes
- Upwelling events and the related nutrient transport in the Gulf of Finland

c) Events

The US/EU-Baltic International Symposium "Ocean Observations, Ecosystem-Based Management & Forecasting", http://www.us-eu-baltic2008.org/ was organized in May 27-29 2008 in Tallinn, Estonia by Oceanic Engineering Society of IEEE and Marine Systems Institute at Tallinn Technical University. From total of 124 papers, 23 papers were presented where Estonian scientists were authors or co-authors.

2. Key results

Objective 1. Better understanding of the energy and water cycles over the Baltic Sea basin

Key results on processes:
- water exchange and mixing [39, 42]
- coastal upwelling [27, 43, 45]
- coastal [12] and terrestrial [32] wind fields
- waves [13]
- precipitation [26]

Objective 2. Analysis of climate variability and change since 1800 and provision of regional climate projections over the Baltic Sea basin for the 21st century

Key results on topics / changes of:
- wind fields [11] and storminess [9]
- sea level [14]
- underwater light [34]
- lake sediments [19, 20]
- coastal zone system [36]

Objective 3. Provision of improved tools for water management with an emphasis on more accurate forecasts of extreme events and long-term changes

Key results on topics:
- oceanographic and meteorological support of harbor management [2]
- development and validation of numerical models [31]
- effects of storms on sea and coasts [38, 40, 44]

Objective 4. Gradual extension of BALTEX methodologies to air and water quality studies

Key results on topics:
- water quality / nutrients in sea areas [1], lakes [] and rivers [6, 46]

- nutrient fluxes from atmosphere [10], agricultural landscapes [5, 8], wetlands [16, 25]
- physical/climatic control of plankton [7, 22, 23, 29]
- remote sensing of ecological status of sea waters [37], lakes [3, 4, 17, 30, 35], forests [18, 33]
- ecological effects of oil spills [15]
- ecosystem modeling [21, 41]

3. Planned activities and events with relevance for BALTEX in 2009

Activities, projects

Marine Systems Institute will participate in the BONUS project ECOSUPPORT.

Events

7th Baltic Sea Science Congress, August 17-21, Tallinn www.bssc2009.org . BSSC-2009 is jointly organized by Tallinn University of Technology and University of Tartu, in cooperation with research groups from other Estonian organizations.

5. List of BALTEX publications

Publication records are taken from: www.etis.ee Estonian Research Portal.
Peer-reviewed papers

1. Aigars, J.; Müller-Karulis, B.; Martin, G.; Jermakovs, V. (2008). Ecological quality boundary-setting procedures: the Gulf of Riga case study. Environmental Monitoring and Assessment, 138(1-3), 313 - 326.
2. Alari, Victor; Raudsepp, Urmas; Kõuts, Tarmo. (2008). Wind wave measurements and modelling in Küdema Bay, Estonian Archipelago Sea. Journal of Marine Systems, xx - xx. [accepted]
3. Alikas, Krista; Reinart, Anu (2008). Validation of the MERIS products on large European lakes: Peipsi, Vänern and Vättern. Hydrobiologia, 599, 161 - 168.
4. Arst, H.; Erm, A.; Herlevi, A.; Kutser, T.; Leppäranta, M.; Reinart, A.; Virta, J. (2008). Optical properties of boreal lake waters in Finland and Estonia. Boreal Environment Research, 13(2), 133 - 158.
5. Deelstra, J.; Iital, A. (2008). The use of the flashiness index as a possible indicator for nutrient loss prediction in agricultural catchments. Boreal Environment Research, 3, 209 - 221.
6. Ennet, P.; Pachel, K.; Viies, V.; Jürimägi, L.; Elken, R. (2008). Estimating water quality in river basins using linked models and database . Estonian Journal of Ecology, 57(2), 83 - 99.
7. Heinsalu, A.; Luup, H.; Alliksaar, T.; Nõges, P.; Nõges, T. (2008). Water level changes in a large shallow lake as reflected by the plankton: periphyton-ratio of sedimentary diatoms . Hydrobiologia, 599, 23 - 30.
8. Iital, A.; Pachel, K.; Deelstra, J. (2008). Monitoring of diffuse pollution from agriculture to support implementation of the WFD and the Nitrate Directive in Estonia. Environmental Science and Policy, 11(2), 185 - 193.
9. Jaagus, J.; Post, P.; Tomingas, O. (2008). Changes in storminess on the western coast of Estonia in relation to large-scale atmospheric circulation. Climate Research, 36(1), 29 - 40.
10. Kaasik, M.; Ploompuu, T.; Ots, R.; Meier, E.; Ohvril, H.; Okulov, O.; Teral, H.; Neiman, L.; Russak, V.; Kallis, A.; Post, P. (2008). Growth Acceleration of Pinus Sylvestris in Bog Stands due to Intensified Nutrient Influx from the Atmosphere. Oil Shale, 25(1), 75 - 93.
11. Keevallik, S.; Soomere, T. (2008). Shifts in early spring wind regime in North-East Europe (1955-2007). Climate of the Past, 4(3), 147 - 152.
12. Keevallik, Sirje (2008). Wind speed and velocity in three Estonian coastal stations 1969-1992. Estonian Journal of Engineering, 14(3), 209 - 219.
13. Kelpšaite, Loreta; Herrmann, Heiko; Soomere, Tarmo (2008). Wave regime differences along the eastern coast of the Baltic Proper. Proceedings of the Estonian Academy of Sciences, 57(4), 225 - 231.

14. Kont, A.; Aunap, R.; Jaagus, J.; Ratas, U.; Rivis, R. (2008). Implications of Sea-Level Rise for Estonia. Journal of Coastal Research, 24(2), 423 - 431.
15. Kotta, J.; Aps, R.; Herkül, K. (2008). Predicting ecological resilience of marine benthic communities facing a high risk of oil spills. Coastal Environment 2008 (101 - 110).WIT Press
16. Kull, Ain; Kull, Anne; Jaagus, Jaak; Kuusemets, Valdo; Mander, Ülo (2008). The effects of fluctuating climatic and weather events on nutrient dynamics in a narrow mosaic riparian peatland. Boreal Environment Research, 13(3), 243 - 263.
17. Kutser, T.; Metsamaa, L.; Dekker, A.G. (2008). Influence of the vertical distribution of cyanobacteria in the water column on the remote sensing signal. Estuarine Coastal and Shelf Science, 78(4), 649 - 654.
18. Kuusk, A.; Nilson, T.; Paas, M.; Lang, M.; Kuusk, J. (2008). Validation of the forest radiative transfer model FRT. Remote Sensing of Environment, 112, 51 - 58.
19. Leeben, A.; Tõnno, I.; Freiberg, R.; Lepane, V.; Bonningues, N.; Makarõtševa, N.; Heinsalu, A.; Alliksaar, T. (2008). History of anthropogenically mediated eutrophication of Lake Peipsi as revealed by the stratigraphy of fossil pigments and molecular size fractions of pore-water dissolved organic matter. Hydrobiologia, 599, 49 - 58.
20. Leeben, Aina; Alliksaar, Tiiu; Heinsalu, Atko; Lepane, Viia; Veski, Siim (2008). Tracking changes in the organic matter in a lake palaeoecosystem: a spectrophotometric approach. Organic Geochemistry, 39(8), 915 - 918.
21. Lessin, Gennadi; Ossipova, Viktoria; Lips, Inga; Raudsepp, Urmas (2008). Identification of coastal zone of the central and eastern Gulf of Finland by numerical modeling, measurements and remote sensing of chlorophyll a. Hydrobiologia, xx - xx. [accepted]
22. Lilover, Madis-Jaak; Stips, Adolf (2008). The variability of parameters controlling the cyanobacteria bloom biomass in the Baltic Sea. Journal of Marine Systems, 1 [accepted]
23. Lips, Inga; Lips, Urmas (2008). Abiotic factors influencing cyanobacterial bloom development in the Gulf of Finland (Baltic Sea). Hydrobiologia, 614(1), 133 - 140.
24. Mander, Ü.; Lõhmus, K.; Teiter, S.; Mauring, T.; Nurk, K.; Augustin, J. (2008). Gaseous fluxes in the nitrogen and carbon budgets of subsurface flow constructed wetlands. Science of the Total Environment, x - x. [accepted]
25. Mander, Ü.; Lõhmus, K.; Teiter, S.; Uri, V.; Augustin, J. (2008). Gaseous nitrogen and carbon fluxes in riparian alder stands. Boreal Environment Research, 13(3), 231 - 241.
26. Mätlik, O.; Post, P. (2008). Synoptic weather types that have caused heavy precipitation in Estonia in the period. Estonian Journal of Engineering, 14(3), 195 - 208.
27. Myrberg, K.; Lehmann, A.; Raudsepp, U.; Szymelfenig, M.; Lips, I.; Lips, U.; Matciak, M.; Kowalewski, M.; Krężel, A.; Burska, D.; Szymanek, L.; Ameryk, A.; Bielecka, L.; Bradtke, K.; Gałkowska, A.; Gromisz, S.; Jędrasik, J.; Kaluźny, M.; Kozłowski, Ł.; Krajewska-Sołtys, A.; Ołdakowski, B.; Ostrowski, M.; Zalewski, M.; Andrejev, O.; Suomi, I.; Zhurbas, V.; Kauppinen, O-K.; Soosaar, E.; Laanemets, J.; Uiboupin, R.; Talpsepp, L.; Golenko, M.; Golenko, N.; Vahtera, E. (2008). Upwelling events, coastal offshore exchange, links to biogeochemical processes – Highlights from the Baltic Sea Science Congress, March 19 – 22, 2007 at Rostock University. Oceanologia, 50(1), 95 - 113.
28. Ojaveer, E.; Kalejs, M. (2008). On ecosystem-based regions in the Baltic Sea. Journal of Marine Systems, x - x. [accepted]
29. Olli, K.; Clarke, A.; Danielsson, Å.; Aigars, J.; Conley, D.; Tamminen, T. (2008). Diatom stratigraphy and long-term dissolved silica concentrations in the Baltic Sea. Journal of Marine Systems, 73(3-4), 284 - 299.
30. Paavel, B.; Arst, H.; Reinart, A. (2008). Variability of bio-optical parameters in two North-European large lakes. Hydrobiologia, 599(1), 201 - 211.
31. Passenko, Jelena; Lessin, Gennadi; Erichsen, Anders Christian; Raudsepp, Urmas (2008). Validation of hydrostatic and non-hydrostatic versions of hydrodynamical model MIKE 3 applied for the Baltic Sea. Estonian Journal of Engineering, 14(3), 255 - 270.
32. Post, P.; Kärner, O. (2008). Simple statistical structure in time series for daily air flow characteristics. Environmetrics, 19(1), 49 - 59.
33. Rautiainen, M.; Lang, M.; Mõttus, M.; Kuusk, A.; Nilson, T.; Kuusk, J.; Lükk, T. (2008). Multi-angular reflectance properties of a hemiboreal forest: an analysis using CHRIS PROBA data. Remote Sensing of Environment, 112(5), 2627 - 2642.

34. Reinart, A.; Pedusaar, T. (2008). Reconstruction of the time series of the underwater light climate in a shallow turbid lake. Aquatic Ecology, 42(1), 5 - 15.
35. Reinart, Anu; Reinhold, Markus (2008). Mapping Surface Temperature in Large Lakes with MODIS data. Remote Sensing of Environment, Vol 112/2, 603 - 611.
36. Rosentau, Alar; Vassiljev, Jüri; Saarse, Leili; Miidel, Avo (2008). Proglacial lake shorelines of Estonia and adjoining areas. Polish Geological Institute Special Papers, 81 - 86.
37. Sipelgas, Liis; Raudsepp, Urmas; Uiboupin, Rivo (2008). Optical and physical properties of coastal water and their relations to radar (ASAR) data- case study of Muuga Bay in the Gulf of Finland. Estonian Journal of Ecology, 185 - 197.
38. Soomere, T.; Behrens, A.; Tuomi, L.; Nielsen, J.W. (2008). Wave conditions in the Baltic Proper and in the Gulf of Finland during windstorm Gudrun. Natural Hazards and Earth System Sciences, 8(1), 37 - 46.
39. Soomere, Tarmo; Myrberg, Kai; Leppäranta, Matti; Nekrasov, Aleksei (2008). The progress in knowledge of physical oceanography of the Gulf of Finland: a review for 1997-2007. Oceanologia, 50(3), 287 - 362.
40. Suursaar, Ü.;Jaagus, J.; Kont, A.;Rivis, R.;Tõnisson, H. (2008). Field observations on hydrodynamic and coastal geomorphic processes off Harilaid Peninsula (Baltic Sea) in winter and spring 2006-2007. Estuarine Coastal and Shelf Science, 80(1), 31 - 41.
41. Zalesny, V.B.;Tamsalu, R.; Männik, A. (2008). Multidisciplinary numerical model of a coastal water ecosystem. Russian Journal of Numerical Analysis and Mathematical Modelling, 23(2), 207 - 222.
42. Zhurbas, V. M.; Laanemets, J.; Kuzmina, N.P.; Muraviev, S.S.; Elken, J. (2008). Direct estimates of the lateral eddy diffusivity in the Gulf of Finland of the Baltic Sea (based on the results of numerical experiments with an eddy resolving model). Oceanology, 48(2), 175 - 181.
43. Talpsepp, Lembit (2008). On the influence of the sequence of coastal upwellings and downwellings on the surface water salinity in the Gulf of Finland. Estonian Journal of Engineering, 14(1), 29 - 41.
44. Tõnisson, H.; Orviku, K.; Jaagus, J.; Suursaar, Ü.; Kont, A.; Rivis, R. (2008). Coastal Damages on Saaremaa Island, Estonia, Caused by the Extreme Storm and Flooding on January 9, 2005. Journal of Coastal Research, 24 (3), 602 - 614.
45. Uiboupin, Rivo; Laanemets, Jaan (2008). Upwelling characteristics derived from satellite sea surface temperature data in the Gulf of Finland, Baltic Sea. Boreal Environment Research, x1 - x2. [accepted]
46. Vassiljev, A.; Blinova, I.; Ennet, P. (2008). Source apportionment of nutrients in Estonian rivers. Desalination, 226, 222 - 230.

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by Timo Vihma, Country: Finland

1. Past year's activities, projects and events:

The Finnish Meteorological Institute (FMI) has studied precipitation on the basis of radar data analyses and high-resolution numerical modelling. The research has focused on further development of quantitative estimates of areal precipitation with operational methods, and on extreme meso-scale precipitation events. Radar based (urban) flood research and product development has been made through the collaboration of FMI, SYKE, TKK, and private companies. Mesoscale precipitation climatologies have been studied on the basis of radar data to calculate new area-time accumulation statistics for hydrological planning. FMI, University of Helsinki and Vaisala company have studied precipitation processes in snowfall. Climatology of heavy precipitation, prolonged periods with little rain, and annual maximum snow depth have been analysed in FMI.

FMI has maintained the Sodankylä observatory as a CEOP reference site. The data are continuously delivered to CEOP. The Sodankylä-Pallas site has been further developed as a calibration and validation site for remote sensing satellites.

FMI and University of Helsinki have studied the effects of climate change on the snow, frost and sea ice conditions in the Baltic Sea catchment area. FMI has studied the energy budget of snow and ice with a particular focus on the surface albedo.

FMI has started to prepare a wind atlas for Finland. It will represent the wind climatology over the last 20 years in the lowermost 400 m of the atmosphere.

2. Key results (may be bullet points, make reference to BALTEX objectives 1 to 6):

Objective 1. Better understanding of the energy and water cycles over the Baltic Sea basin
improved understanding on snow and ice albedo and the factors controlling its variability

Objective 2. Analysis of climate variability and change since 1800, and provision of regional climate projections over the Baltic Sea basin for the 21st century
 new results on the changes in frost, snow, and Baltic sea ice cover by the end of the twenty-first century based on climate model projections
 new results on summer precipitation climate in southern Finland

Objective 3. Provision of improved tools for water management, with an emphasis on more accurate forecasts of extreme events and long-term changes
 considering radar based mesoscale area-intensity climatology of precipitation, the very large data sample yields figures of the probability of extreme rainfall occasions (e.g. return period > 1000 years), which are practically impossible to detect with much smaller samples of gauge data.

3. Planned activities and events with relevance for BALTEX in 2009:

FMI participates in the EU COST Action 728, which integrates mesoscale meteorological models and air pollution and dispersion models. Relevant for BALTEX objective 4.

The Academy of Finland will fund a joint research project (2009-2012) of FMI, University of Helsinki (UH) and NASA/Precipitation Measurement Mission (PMM), in which methodologies related to the GPM satellite measurement algorithms and ground validation, especially in snowfall, will be studied. Relevant for BALTEX objective 3.

CloudSat community and NASA PMM will arrange together with FMI and UH a field campaign at Helsinki Testbed in September-October 2009, which concentrates on the microphysics and other properties of light precipitation. Relevant for BALTEX objective 3.

The EU Programme Baltic Sea Region (BSR) will fund a 3 year project BALTRAD (2009-2011), which will create tools and products for operational radar data exchange between the countries around the Baltic Sea and thus extends the present BALTEX radar data coverage to Russia, Belarus, Latvia and Lithuania. The coordinating Institute is SMHI. Relevant for BALTEX objective 3.

5. List of BALTEX publications:

BACC Author Team: *Assessment of Climate Change for the Baltic Sea Basin*, Springer Verlag, Berlin Heidelberg, p. 35-131, 2008.

Jylhä, K., S. Fronzek, H. Tuomenvirta, T. R. Carter, and K. Ruosteenoja (2008). Changes in frost, snow and Baltic sea ice by the end of the twenty-first century based on climate model projections for Europe. Clim. Change, 86, 441-462.

Kilpeläinen, T., H. Tuomenvirta, and K. Jylhä (2008). Climatological characteristics of summer precipitation in Helsinki during the period 1951-2000. Boreal Environ. Res., 13, 67-80.

Koistinen, J., Kuitunen, T., Kotro, J., Hohti, H., and Pulkkinen, S., 2008: Derivation of extreme event mesoscale area-intensity return periods of rainfall based on a large sample of radar data. Fifth European Conference on Radar in Meteorol. and Hydrology, Helsinki, 7p. http://erad2008.fmi.fi/proceedings/index/ordered_by_author.html

Pirazzini, R. 2008. Factors controlling the surface energy budget over snow and ice. Finnish Meteorological Institute Contributions, No. 75, 90 p.

Pirazzini, R., and P. Räisänen, 2008: A method to account for surface albedo heterogeneity in single column radiative transfer calculations under overcast conditions, *J. Geopys. Res.*, 113, D20108, doi:10.1029/2008JD009815.

Räisänen, J. (2008). Warmer climate: less or more snow? Clim. Dyn., 30, 307-319.

National Reporting on BALTEX, BALTEX SSG Meeting #23
Reporting period: January-December 2008
Report by: Finnish Institute of Marine Research (FIMR), Finland

In December 2008, the Finnish Parliament approved the governmental proposal to close down the Finnish Institute of Marine Research. From 1 January 2009 on the physical research and services are transferred to the Finnish Meteorological Institute (FMI) while the biological and chemical research to the Finnish Environment Institute (SYKE).

1. Past year's activities, projects and events:

FIMR hosted national workshop about the adaptation of the climate change in the Baltic Sea on 13-14 November 2008. The workshop gathered about 50 experts representing natural sciences, marine engineering and planning, and authorities. Outcome of the workshop will be background paper for the Finnish national adaptation strategy of the climate change.

In October 2008 a five-year project was launched to investigate the Biogeochemistry of the Baltic Sea in a changing climate: From catchment to coast. The work will focus on dissolved organic matter and inorganic nutrient fluxes and has been funded by the Academy of Finland under their Finland Distinguished Professor Programme (FiDiPro).

2. Key results (may be bullet points, make reference to BALTEX objectives 1 to 6):

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3. Planned activities and events with relevance for BALTEX in 2009:
In FMI a sea-ice field campaign in the Bay of Bothnia on March 2009 will conducted. The measurements focus on the sea-ice dynamics and thermodynamics, sea-ice biogeochemistry ocean-ice-atmosphere interaction and validation of the new remote sensing retrieval methods.
A new EC/FP7 project, SafeWin, will be started on 2009. In that project, FMI will focus on experimental and modelling research of sea-ice dynamics and in particular, modelling of sea-ice compression and development of the operational forecasting of the compressive situations of the ice pack.

In SYKE, the FiDiPro project will continue. The underlying objectives for the next 5 years can be summed up as follows:
1) To establish a biogeochemical study of the Baltic from catchment area to the open sea to investigate how inorganic and organic matter is released from terrestrial systems, transformed as it passes through freshwaters before being released into coastal waters.
2) To utilize the relevant existing data and establish studies to fill knowledge gaps in order to understand the seasonal differences in transport, transformation and biological effects.
3) To investigate the effects organic matter and nutrient fluxes of a warming Baltic Sea and the surrounding catchment area, and the linkages between the systems.
A key requirement at the start of the project will be to set up collaborative links with a much wider group of researchers with interests in catchment to coast processes throughout the Baltic catchments. The BALTEX vision and the BALTEX network of researchers will be central to this.

SYKE will participate as a partner in the BONUS BalticWay project. The project consortium involves several participants with experience in climate modelling. The project approach makes use of the existence of semi-persistent current patterns that affect the propagation of pollution. The planned management applications would allow placing dangerous activities in areas where an accident will pose a minimum threat to vulnerable zones.

4. Publications
Suomi, I.; Andrejev, O.; Myrberg, K. 2008: Parameterization of flow along sloping bottom in a hydrostatic z-coordinate model - major Baltic inflow 1993 as a test case. - Geophysical Research Abstracts 10.

Soomere, Tarmo; Myrberg, Kai; Nekrasov, Alexei 2008: The progress in knowledge of physical oceanography of the Gulf of Finland : a review for 1997-2007. - Oceanologia 50(3):287-362.
Lehmann, Andreas; Myrberg, Kai 2008: Upwelling in the Baltic Sea - a review. - Journal of Marine Systems 74:53-512.
Leppäranta, M. & Myrberg, K. 2009: Physical Oceanography of the Baltic Sea. - Springer Praxis Books, Geophysical Sciences, 378 p
Tedesco, L., Vichi, M., Haapala, J. and Stipa, T. 2009: An enhanced sea-ice thermodynamic model applied to the Baltic Sea. 2009. Boreal Environmental Research, 14(1).

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Bernd Schneider, IOW **Country:** Germany

Research projects at the IOW that are explicitly designated as BALTEX activities refer to the Baltic Sea CO2/carbon cycle and thus to BALTEX Phase II. In this context, the IOW will significantly contribute to the approved BONUS Project "Baltic-C" and will be in charge for the sub-project: "Measurements of the Baltic Sea CO2 system and carbon inventories". Several research activities have taken place in 2009 that can be considered as preparation and basis for the research within Baltic-C:

1.) Continuation of the pCO2 and O2 measurements on a cargo ship commuting between Lübeck and Helsinki. Four transects with a high spatial resolution (1 – 2 km) are obtained every week and allow the identification and quantification of biogeochemical processes such as biomass production and nitrogen fixation. The measurements are performed in cooperation with the Algaline project of the FIMR and will be continued in the coming years.

2.) MERIAN cruise in June/July 2008: The horizontal and vertical distribution of total CO2 were determined between the Kattegatt and the upper north of the Bothnian Bay. This was the first synoptic mapping of the total CO2 that covered the entire Baltic Sea. The data will be used to calculate the excess CO2 produced by the mineralization of organic matter and stored below the halocline. Moreover, the measurements are providing useful data for the validation of model simulation that will be performed within Baltic-C.

3.) Analysis of time-series data: The vertical profiles of total CO2 at the central Gotland Sea station BY15 were determined five times per year since 2003 in the frame of the IOW monitoring programme. A two-years stagnation period during May 2004 and July 2006 was identified and used to determine the rates and the kinetics of the mineralization of organic matter. Moreover, since the deep water switched from oxic to anoxic conditions during this period, the removal of ammonia and nitrate by denitrification could be quantified. The results of these investigations are supporting the process parametrizations in biogeochemical models that will be developed within Baltic-C.

BALTEX publication:

Rutgersson, A., Norman, M., Schneider B., Pettersson H, and Sahlee E. 2008. The annual cycle of carbon dioxide and parameters influencing the air-sea carbon exchange in the Baltic Proper. Journal of Marine Systems 74:381-394

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Andreas Lehmann, IFM-GEOMAR , Country: Germany

1. Past year's activities, projects and events:

BONUS-Proposal: COFFEX (Coastal and offshore exchange processes), failed
BONUS-Proposal: BalticWay (coordinator Tarmo Soomere), successful

Running projects in 2008:

-Upwelling in the Baltic Sea (DAAD, joint project with FIMR, Kai Myrberg)
-Tracking the invasion of Mnemiospsis leidyi to the Baltic Sea (IFM-GEOMAR, internal)
-CAVIAR (Climate Variability of the Baltic area, DTU Denmark, IFM-GEOMAR)
-Meta-analysis of climate plankton-fish interaction across semi-enclosed European Shelf seas (EUR-Oceans, Network of Excellence)

Events:
The Sixth Workshop on Baltic Sea Ice Climate, August 25–28, 2008, Lammi Biological Station, Finland

2. Key results (may be bullet points, make reference to BALTEX objectives 1 to 6):

Activities related to objectives 1 and 2

3. Planned activities and events with relevance for BALTEX in 2009:

Proposal: BSR-CLIDANET, Baltic Sea Region Programme 2007-2013

Participation:
-Bonus-Kickoff BalticWay,12-15 January 2009
-Climate Change in the southern Baltic Region, Szczecin Poland, 25-28 May 2009
-7th BSSC Tallin Estonia, 17-21 August 2009

5. List of BALTEX publications 2008:

Lehmann, A., Javid Pour, J., Clemmesen C., Petereit C. and Schmidt J. Mnemiopsis leidyi, a new invader to the Baltic Sea: Possible pathways of distribution. BALTEX Newsletter No. 11, 13-15.

Myrberg, K., Lehmann, A. Raudsepp, U. et al. Upwelling events, coastal offshore exchange, links to biogeochemical processes - Highlights from the Baltic Sea Science Congress at Rostock University, Germany, 19-22 March 2007. Oceanologia, 50 (1), 95-113.

Lehmann, A., Hietala, R. The role of brine release and sea ice drift for winter mixing and sea ice formation in the Baltic Sea. Proceedings Report Series of Geophysics of the University of Helsinki (not printed yet).

Lehmann, A. , Myrberg, K. Upwelling in the Baltic Sea - A review. Journal of Marine Systems, 74 , 3-12, doi: 10.1016/j.jmarsys.2008.02.010.

Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: F.Berger, F.Beyrich, DWD-Lindenberg; **Country:** Germany

1. Past year's activities, projects and events:

Coordination of European CEOP in-situ reference sites (Cabauw, Sodankylä, Lindenberg) in the context of providing continuous observational data for the Central Data Archive (CDA) at NCAR for GEWEX/CEOP;

Continuous data delivery of Lindenberg data to CDA;

European CEOP reference sites manager meeting held 21 to 23 April 2008 in Lindenberg, Germany;

Participation at annual CEOP meeting in Geneva, Switzerland; September 2008.

3. Planned activities and events with relevance for BALTEX in 2009:

Continuous reference site data delivery;
CEOP annual meeting planned for August 2009

5. List of BALTEX publications:

Beyrich, Frank, 2008: BALTEX Reference Site Data Managers discussed further contributions to CEOP. BALTEX Newsletter No 11.

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Jan Piechura, IO-PAN Sopot, Country: Poland

1. Past year's activities, projects and events:
-Participation in the Goteborg workshop 1-3.12.2008 (K. Kuliński)
-participation in the Baltic-C, BONUS project proposal, that has been accepted for financing (coordinated by Prof.Omsted)
- During the period January to December 2008: 4 research cruises by R.V. Oceania were done (fig.1). Stormy weather in January did not allow research in the Bornholm Deep, Bornholm Gate and Arkona Basin and because of some ship problems October cruise had to be canceled. High resolution transect along the line Gdansk Deep - Slupsk Channel - Bornholm Deep, Bornholm Gate - Arkona Basin was obligatory for each cruise. Depending on weather and time available additional, perpendicular transects in Slupsk Furrow, Bornholm Deep and Gate and Arkona Basin were performed.
-Robert Osiński's PhD thesis on "Simulation of dynamic of the Baltic Sea by coupled ice-ocean model" has been successfully completed.

2. Key results (may be bullet points, make reference to BALTEX objectives 1 to 6):
-establishing the Baltic-North Sea carbon exchange (manuscript in preparation)
-establishing factors influencing DOC concentration in the Baltic sea-water (published in Est.Coast.Shelf Sci, 2008)
-parametrization of the 1-dimentional POC model for the southern Baltic (manuscript in preparation)
- Nearly whole year of 2008 was typical for stagnation in the south-western Baltic Sea, only December data show some more saline water at the bottom layer of the Arkona Basin and Bornholm Gate (> 20 psu), while winter and spring records where about max 16 psu. Hight surface layer temperature in January, April and December 2008 - about 5^{o}C and 8^{o}C, is worth to mention
- 2 km and 9 km resolution models developed by R. Osiński give very interesting information on water circulation in the southern Baltic Sea

3. Planned activities and events with relevance for BALTEX in 2009:
-organizational work on the BALTEX 2010 science conference
-participation in the Szczecin 2009 climate conference, co-organized by BALTEX
-workshop on carbon burial rates in the Baltic
- monitoring of physical environment of the Baltic Proper (4 research cruises of R.V. Oceania).

4. Issues and recommendations:

5. List of BALTEX publications:

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Z. Kundzewicz, Country: Poland

1. Past year's activities, projects and events:
In 2008, the Research Centre for Agricultural and Forest Environment participated in a number of projects of relevance to BALTEX, such as the EU IPs (6. FP):
ADAM (Adaptation and Mitigation Strategies);
WATCH (Water and Global Change), and
ENSEMBLES (Ensemble-based predictions of climate changes and their impacts)

and the Polish integrated project - Extreme meteorological and hydrological events in Poland.

2. Key results (may be bullet points, make reference to BALTEX objectives 1 to 6):
An important finding was detection of a record-warm 12 consecutive months from July 2006 to June 2007 at a number of scales, from point through regional, continental, to hemispheric (Northern Hemisphere).

3. Planned activities and events with relevance for BALTEX in 2009:
Planned activities of relevance to Baltex in 2009 embrace the study of changing flood risk on the pan-European scale. Emphasis on the Baltic Sea basin, and the uncertainty of the existing projections is planned.

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Prof. Valery Vuglinsky **, Country:** State Hydrological Institute, Russian Federation

1. Past year's activities, projects and events (key results)

1.1 Better understanding of the energy and water cycles over the Baltic Sea basin

The investigations on peculiarities of current and future river and lake ice regime formation in the Russian part of the Baltic Sea basin were conducted with emphasize on extension of data base. A new data on air temperature and ice regime characteristics were included into the data base. (State Hydrological institute). .

1.2. Analysis of climate variability and change since 1800, and provision of regional climate projections over the Baltic Sea basin for the 21st century

A database of current air temperature and precipitation observations from 15 weather stations of the Leningrad Region for the period since observations started up to 2001 was assembled. This database will be useful for analysis of regional changes in the above climatic characteristics (State Hydrological Institute).).

1.3. Provision of improved tools for water management, with an emphasis on more accurate forecasts of extreme events and long-term changes

Estimations of changes in maximum depth of ice cover on the rivers and lakes of Russia for the last 20 years as compared with the previous 30-year period as well as technical approaches to these estimations were improved. Refined estimations of possible changes in maximum depth of ice cover for the coming 15-20 years were also given.(State Hydrological Institute)

Activities on the creation of a Scheme for integrated water use and water conservation in the Neva River basin were started. The project is aimed at determining acceptable anthropogenic load on water resources in the Neva River basin, evaluation of prospective demands for water resources as well as outlining the main directions for water objects conservation and rehabilitation and prevention from adverse effects of waters The project will be implemented in 2008-2010 (Neva-Ladoga Basin Regional Administration). .

1.4. Gradual extension of BALTEX methodologies to air and water quality studies

Joint Russian-Finnish research on assessment of sediment pollution in the Okhta River channel and the Okhta reservoir (the Neva River basin) within the framework of the joint Russian-Finnish project "Cooperation in assessment of ecological feasibility for the Okhta River bottom dredging" funded by EU is now in progress. The preparation of recommendations on ecological feasibility of bottom dredging on small rivers of the Neva River basin was started. (Russian State Hydrometeorological University).

1.5. Strengthened interaction with decision makers, with emphasis on global change impact assessment

Conference "Baltic Sea Region Programme 2007-2013: new partnership opportunities for Russian and Belorussian regions" was held on 16-17 April, 2008 in Saint-Petersburg. During the Conference, the results of implementation of the Baltic Sea Region INTERREG III B Neighbourhood Programme in 2004-2006 were discussed and the new priority projects to be implemented under this programme in 2008-2014 were considered (Fig.1). A "Partner Search Cafe" offered participants a possibility to present their project ideas in order to attract partners for future studies. The main Baltic Sea Programme documents for 2008-2013 were also studied.

1.6. Education and outreach at the international level

The Baltic University Programme was actively implemented at the Saint-Petersburg State University. Within the framework of this programme, the following courses were organized: "A sustainable Baltic Region development", "The Baltic Sea Environment", "Sustainable Water Management" and others.. The courses were attended by the students of departments of geography from more than 30 higher institutions of Saint-Petersburg. About 25 students attended different "summer courses" related to issues of ecology and the Baltic Region sustainable development.

The training course organized under the Russian-German Programme called "POMOR" of master's degree in the area of polar marine research was continued at the Saint-Petersburg State University. The Programme covers some issues of studying hydrometeorological and ecological aspects of the Baltic Sea and its Basin.

3. Planned activities and events with relevance for BALTEX in 2009:
The next admission on the "POMOR" programme will start at the middle of 2009 at the St.Petersburg State University..
4. Issues and recommendations:

5. List of BALTEX publications:
Shalashina T.A. The estimation of inundation zones on the rivers of North-West territory of Russia, Proceedings of the Institute of Applied Geophisics,. Moscow, 2008 (in Russian).

National Reporting on BALTEX, BALTEX SSG meeting #23
Reporting period: January to December 2008
Report by: Anders Omstedt, SMHI**,** Benjamin Smith, Anna Rutgersson **Country:** Sweden

1. Past year's activities, projects and events:

The research within the ocean climate group (www.oceanclimate.se) at University of Gothenburg focus on BALTEX II objectives 1, 2 and 4. At the Centre of Earth System Sciences at the University of Gothenburg (www.tellus.science.se) Baltic Sea and Arctic Research are in focus, which is also of relevance for the BALTEX. During 2008 TELLUS and BALTEX organised a joint workshop related to land-sea interaction.

The research at SMHI (www.smhi.se) include focus on all BALTEX objectives in a wide range of national and international projects. Three meetings/workshops with particular relevance to BALTEX were organized by SMHI in Norrköping during 2008; Workshop on the utility of regional climate models in connection with BSSG#22 in January, Rossby Centre days on Nordic-Arctic Climate Change: Towards an Earth System Approach, 13-14 October, Workshop on "Can we save the Baltic Sea? Eutrophication in future climate" 21 October.

Research at the Geobiosphere Science Centre of Lund University encompasses several areas of relevance to understanding of the regional climate/Earth-system dynamics as well as land-sea biogeochemical interactions in the Baltic Sea area. Lund is involved in the BONUS project Baltic-C, contributing modelling of vegetation dynamics and organic carbon in land runoff and collaborate with Rossby Centre, SMHI on the development of a regional Earth system/integrated assessment model that emphasises boreal and arctic regions and processes. There is interest in nutrient dynamics and eutrophication at the Department of Geology.

The research at the meteorology group at Uppsala University (http://www.geo.uu.se/luva/) focuses mainly on BALTEX II objectives 1 and 4. The research involves investigating processes controlling air-sea exchange of energy water as well as on parameters of importance for air and water quality (air-sea interaction). The aquatic environmental analysis group focuses objectives 3 and 4 with strong emphasis on water quality and water management.

2. Key results (bullet points, make reference to BALTEX objectives 1 to 6):

- Publication of the BACC book

Objective 1

- BALTEX special issue of BER (Gustafsson, E.O., and A., Omstedt, 2009) on "Sensitivity of Baltic Sea deep water salinity and oxygen concentration to variations in physical forcing"
- BALTEX special issue of BER (Lind, P. & Kjellström, E. 2009) on Water budget in the Baltic Sea drainage basin: Evaluation of simulated fluxes in a regional climate model.
- BALTEX special issue of BER (Carlsson, B., Rutgersson, A. & Smedman, A.-S. 2009) on Investigating the effect of a wave-dependent momentum flux in a process oriented ocean model.
- Reconstruction of past 500 years sea ice and water temperatures in the Baltic Sea (Hansson, D. and A., Omstedt, 2008).
- Regional climate-vegetation model RCA3-GUESS identifies potential 'hotspots' of vegetation feedbacks on surface energy balance and climate under future GHG forcing in Europe (including BALTEX window) (Wramneby et al. 2008).
- Swedish research councils project "Towards tools for the assessment of coupled changes in climate, ecosystems and land use" launched. The interdisciplinary project is a collaboration between Lund University, Rossby Centre SMHI and Univ Edinburgh and places a special emphasis on the NW European boreal and subarctic region and its Earth system processes (e.g. treeline advance, permafrost dynamics, wetland biogeochemistry).
- Developing a coupled regional climate – wave model (RCA-WAM).

Objective 2

- BALTEX special issue of BER (Kjellström, E. & Lind, P. 2009) on Changes in the water budget in the Baltic Sea drainage basin in future warmer climates as simulated by the regional climate model RCA3.

Objective 3

- BALTEX special issue of BER (Graham, L. P., Olsson, J., Kjellström, E., Rosberg, J., Hellström, S.-S. & Berndtsson, R. 2009) on Simulating river flow to the Baltic Sea from climate simulations over the past millennium.
- Swedish Research Programme on Climate, Impacts and Adaptation (Mistra-SWECIA) launched. This large interdisciplinary effort, coordinated from SMHI, encompasses various aspects of relevance to BALTEX objectives including climate-economy-ecosystem interactions and modelling, water supply and quality, urban flooding risk associated with extreme rainfall. Geographically, the target area is "Sweden in a European and a global context".

Objective 4.

- Evaluation of observed total alkalinities in the Baltic Sea (Hjalmarsson, S., Wesslander, K., Anderson, L.G., Omstedt, A., Perttilä, M., and L., Mintrop, 2008).
- Production of coupled climate change, marine nutrient and ecosystem change scenarios using the RCO-SCOBI model.
- Development of new hydrological water quality model HYPE.
- Funding of the Baltic-C and ECOSUPPORT Bonus projects.
- BALTEX special issue of BER (Langner, J., Andersson, C. & Engardt, M. 2009) on Atmospheric input of nitrogen to the Baltic Sea basin: present situation, variability due to meteorology and impact of climate change.
- BALTEX special issue of BER (Rutgersson, A., Norman, M. & Åström, G. 2009) on Atmospheric CO2 variation over the Baltic Sea and the impact on air–sea exchange.
- DOC-production model for boreal wetlands developed and tested by Lund PhD student Alla Yurova (Yurova et al. 2008)
- The land rise after the last glacial ice results in the release of vast amounts of previously deposited nutrients and clay particles to the system (Håkanson and Bryhn, 2008).

Objectives 5 and 6

- Three open BALTEX related workshops organized by SMHI.
- Mistra-SWECIA organize science seminars and workshops with stakeholders regularly (see www.mistra-swecia.se)

3. Planned activities and events with relevance for BALTEX in 2009:

Gothenburg:

- The Baltic-C Bonus program.
- Two PhD thesis related to the Baltic Sea climate.

SMHI:

- The ECOSUPPORT Bonus project, the Interreg BALTRAD project, application for an Interreg project on data management for the Baltic Sea, plus additional national projects on various BALTEX-related topics.
- Mistra-SWECIA programme continues.
- Production of new coupled RCAO climate scenarios for the Baltic Sea basin.
- Rossby Centre Day 2009
- ECOSUPPORT Workshop on the Baltic Sea Ecosystem 2009

Lund:

- 2nd Intl Lund RCM Workshop, 4-8 May, Lund Univ
- Vegetation dynamics and terrestrial ecosystem biogeochemistry (DOC) modelling of Baltic Sea Basin (contribution to BONUS Baltic-C)

Uppsala:

- One PhD thesis related to processes controlling energy and water exchange at the ocean surface.

5. List of BALTEX publications:

Almroth E., M. Skogen, I. Sehested Hansen, T. Stipa, and S. Niiranen. (2008) The year 2006- An eutrophication status report of the North Sea, Skagerrak, Kattegat and the Baltic Sea. A demonstration project., SMHI Oceanography No 91.

Andersson, L., Alkan Olsson, J, Arheimer, B, and Jonsson, A. (2008) Use of participatory scenario modelling as a platform in stakeholder dialogues. Water SA 34 (4) HELP Special Edition.

Arheimer, B., Lindström, G., Pers, C., Rosberg, J. & Strömqvist, J. (2008) Development and test of a new Swedish water quality model for small-scale and large-scale applications. XXV Nordic Hydrological Conference, Reykjavik, August 11-13, 2008. NHP Report No. 50, pp. 483-492.

BACC Author Team (2008).Assessment of climate change for the Baltic Sea basin.Series: Regional Climate Studies. ISBN: 978-3-540-72785-9. Springer-Verlag.

Eriksson, L. E. B., Borenäs, K., Dierking, W., Pemberton, P., Griph, S., and Lindh, H. (2008) "Improved sea-ice monitoring for the Baltic Sea: Project overview and first results", Proceedings of The 2nd International Workshop on Advances in SAR Oceanography from Envisat and ERS Missions, Frascati, Italy, 21-25 January, 2008.

Gustafsson, E.O., and A., Omstedt (2008). Sensitivity of Baltic Sea deep water salinity and oxygen concentrations to variations in physical forcing. Boreal environmental Research, in press.

Gyllenhammar, A., Håkanson, L. and Lehtinen, K.-J., 2008. A mesocosm fish farming experiment and its implications for reducing environmental effects on a regional scale. – Aquacultural Engineering, 38: 117-126.

Gästgifvars, M. , Müller-Navarra S., Funkquist L. and Huess V. (2008) Performance of operational systems with respect to water level forecasts in the Gulf of Finland, Ocean Dynamics, Vol 58, No 2.

Hansson, D. and A., Omstedt, (2008).Modelling the Baltic Sea ocean climate on centennial time scale; temperature and sea ice. Climate Dynamics 30, 763-778. DOI 10.1007/s00382-007-0321-2

Hjalmarsson, S., Wesslander, K., Anderson, L.G., Omstedt, A., Perttilä, M., and L., Mintrop (2008).Distribution, long-term development and mass balance calculation of total alkalinity in the Baltic Sea. Continental Shelf Research 28(4–5), 593–601. DOI 10.1016/j.csr.2007.11.010

Heino, R. ; Tuomenvirta, H. ; Gustafsson, B. et al. (2008). Chapter 2: Detection of past and current climate change. The BALTEX Assessment of Climate Change for the Baltic Sea basin. pp. 35-132. ISBN: 978-3-540-72785-9. Springer-Verlag.

Håkanson, L. and Bryhn, A.C., 2008. Tools and criteria for sustainable coastal ecosystem management – with examples from the Baltic Sea and other aquatic systems. - Springer Verlag, Berling, Heidelberg, 292 p.

Håkanson, L. and Bryhn, A.C., 2008. Eutrophication in the Baltic Sea – present situation, nutrient transport processes, remedial strategies. Springer Verlag, Berling, Heidelberg, 264 p.

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Appendix 5: BACC II WG meeting minutes

BALTEX Assessment of Climate Change for the Baltic Sea Basin II (BACC II)

BACC II Working Group meeting

Finnish Meteorological Institute (FMI), Helsinki, Finland
12 January 2009, 6 pm-7.30 pm

Minutes

Participants include:
BACC II WG members Sirje Keevallik, Maria Laamanen, Juha-Markku Leppänen, Anders Omstedt, Timo Vihma, Hans von Storch (chair), Hans-Jörg Isemer;
and
Valery Vuglinsky

Topics

1. Review aftermath BACC book publication
2. Purpose and principles of BACC II
3. BACC II report structure draft
4. BACC II suggested future timeline
5. BACC SSC membership

1. Review aftermath BACC book publication

Hans reviewed the impressive media response material which had been compiled by the BALTEX Secretariat, see summary statistics in Annex 1. It was noted that the responses archived so far may not be complete and the Secretariat is asked to continue action towards a complete overview on responses in both the relevant science communities and the public.

2. Purpose and principles of BACC II

Hans reviewed and suggested the purpose and principles of BACC II, which were approved by the participants as given in Annex 2. Particular issues discussed and approved include

- the need for *consensus* opinion also on *dissent*, if a consensus cannot be reached among experts on a particular topic. BACC II needs to represent consensus to broaden the acceptance. Minority views should be listed and possible methodical limitations of reviewed studies need be mentioned. Also, BACC II should avoid overweighting individual papers, which are not (yet) supported by independent analysis by other parties.

- *detection and attribution.* BACC II needs to first document the changes, then address whether these are unlikely to be a possible swing in the natural sequence of events and finally select the most plausible ones (attribution) from a series of different explanations. Also, BACC II shall document changes until very recently, because there has been a trend reversal with the NAO in the late 1990s.

- *homogeneity of observational data.* This must be thoroughly addressed in order to identify processes which may have influenced or even contaminated data series.

- *presentation style* of results, which must avoid normative statements and "sloppy" language.

3. BACC II report structure draft

Based on a suggestion presented by Hans, a first overview on contents and structure of the future BACC II report was established, see Annex 3. Core chapters of the BACC report published in 2008 (referred to as *BACC I*

further on) will be maintained, but several new chapters and also an extended structure of sections in chapter 2 were suggested, as follows:

Chapter 2 is planned to include sections on *sea level, sea-ice* and climate in *cities*. The latter topic will be new in BACC II, while *sea level* and *sea-ice* were sub-sections to the BACC I *Baltic Sea* section in chapter 2, but are "upgraded" now in BACC II to stay each as a separate section parallel to the section on the Baltic Sea, thereby more visibly representing the relevance of these parameters for *e.g.* the society.

The contents of Chapter 3 is new and is expected to deal with climate change and variability of *the past 1000 years* or so, thus covering also paleo-climate data and time scales.

"*Skill of models for describing regional climate*" is partly already covered by BACC I, but shall be extended and brought up more upfront in BACC II and is therefore planned as a separate Chapter 4.

Chapters 6, 9 and 10 are new in BACC II (compared to BACC I). Chapter 10 would stand out from other chapters of the BACC II report because it is suggested to be the result of a dedicated survey among relevant climate researchers about their views on consensus and dissent on climate science, rather than an assessment on available published evidence as with the other chapters. Such a dedicated BACC II survey would have to be conducted under guidance of a relevant expert. Dennis Bray at GKSS was mentioned as a potential candidate.

For each chapter (also sections in chapter 2) **one or two lead authors** shall be identified and appointed by the BACC II Science Steering Committee (SSC, see topic 5 below). As with BACC I, the lead authors for Chapters 2a-f, and 3-9 will be responsible for the overall chapter, with respect to: broad coverage (near-completeness), unbiasedness, fairness and objectivity (to the extent possible). They may invite additional authors to contribute in writing to the chapter, for instance with respect to sub-sections, but any such contribution will not relief the lead authors from their overall responsibility

4. Suggested BACC II future time line

Several aspects were discussed when establishing a first draft timeline for BACC II, see the present schedule in Annex 4. The following thoughts were considered:

1. BACC II should be available roughly 5 years after the publication of BACC I as a executive summary and as a book describing the assessment in sufficient detail.
2. Most of the BONUS+ funded projects started in 2009 (all planned currently for a duration of 3 years) are expected to create evidence to be considered for BACC II, a tentative date for establishing a first BACC II report is set to mid 2011.
3. In May 2010, an international ministerial meeting in the context of HELCOM is planned. It was suggested to explore whether an interim review of BACC I may be conducted with the view to establish new input material to the above HELCOM meeting in the form of an update to the HELCOM's climate report of 2007.
4. The external peer-review including a conference dedicated to both the science community and the public with subsequent revision of the draft BACC II material is planned according to the positive experience made with BACC I.
5. Important for the start of BACC II are both the completion of the BACC II SSC membership and the subsequent identification and nomination of the lead authors, this whole process was suggested to be completed by and large in summer 2009.

5. BACC SSC membership

Hans recalled that the present BACC II Working Group members are at the same time the nucleus of the new Science Steering Committee for BACC II (BACC II SSC). The key task of the SSC is to guide the BACC II process. SSC members are not be involved in documenting the BACC II assessment, but one prominent task will be to identify, approve and motivate lead authors (and, if appropriate, also contributing authors) for the BACC II chapters and chapter 2 sections.

The following individuals were suggested as additional members to the BACC II WG and SSC:

Valery Vuglinsky, Russian State Hydrological Institute (RSHI), St.Petersburg, Russia
(Approved onsite)
Ilppo Vuorinen, University of Turku, Finland

(Official request and confirmation required!)
Mikko Alestalo, FMI, Finland
(Approved at BSSG#23 meeting on 14 January 2009)
Bärbel Müller-Karulis, University of Latvia, Latvia
(Official request and confirmation required!)

Action: The present SSC members are asked to discuss further potential SSC candidates with Hans before the end of February 2009.

With the completion of the SSC membership the terms of reference of the BACC II SSC will have to be adjusted and finally approved before the summer 2009.

A subsequent immediate task of the BACC II SSC will be the identification and approval of BACC II lead authors, preferably to be concluded also before summer 2009.

Draft Hans-Jörg Isemer, 4 Feb 2009
Comments by Hans von Storch, 5 Feb 2009
Approved by participants, 18 Feb 2009

Annex 1

Media Response to BACC I
(Status: known at the BALTEX Secretariat as of 20 February 2009)

Total Media Responses:	115

Media Response to Göteborg BACC Conference, May 2006: 3

Media Response to HELCOM Report, March 2007:	12
Newspapers:	8 (2 EST, 5 FIN, 1 SWE)
Online publications:	3 (3 D)
WCRP:	1

Media Response to BACC Book Publication, January 2008:	100
Newspapers:	62 (55 D, 1 DK, 2 FI, 1 LV, 3 PL)
Online publications:	31 (26 D, 1 FIN, 1 ESP, 1 RU, 2 PL)
TV and Radio:	5
WCRP:	2

Articles on BACC written by the BALTEX or BACC representatives: 8

Related Press Responses:
114 responses to an Interview by Joachim Dippner on " Climate Change Consequences for the Baltic Sea" (based on BACC Chapter 5) in German Newspapers in December 2008

Annex 2

Purpose and principles of BACC II

Purpose
The purpose of the BACC assessment is to provide the scientific community with an assessment of ongoing climate change in the Baltic Sea basin. An important element is the comparison with the historical past **(until about 1000)** to provide a framework for the severity and unusualness of the change. Also changes in relevant environmental systems, due to climate change, shall be assessed – such as hydrological change, ecosystems, and ocean waves.
The overall format is similar to the IPCC process, with author groups for the individual chapters, an overall policymaker-summary, and a review process.
BACC II will formally similar to BACC I, but it will document the consensus about climate knowledge until about 2010.
A survey will be conducted on the opinions of regional climate researchers.

Note: Printed in bold are key changes compared to BACC I.

Principles

- BACC considers only legitimately scientific material, i.e. material available from libraries.
- Scientific contributions are welcome only from scientifically accepted institutions, not from groups with a political, economic or ideological agenda.
- Questions from political, economic or ideological groups are welcome.
- No financing by third parts
- Purpose is the presentation of consensus about knowledge and lack thereof, including the identification of contested issues.
- The assessment will be evaluated by independent scientific reviewers

Annex 3

Draft structure and contents of the future BACC II report

1. Overall assessment and summary
2. Past (mainly 200 years) and current climate change, detection and attribution
   - 2.a Atmosphere
   - 2.b Baltic Sea
   - **2.c Sea ice**
   - **2.d Sea level**
   - 2.e Hydrology
   - **2.f Cities**

3. Climate variability of the past 1000 years
4. Skill of models for describing regional climate
5. Projections of future climate change
6. Effects of changing regional drivers – industrial aerosols and land-use
7. Climate-related terrestrial ecosystem change
8. Climate-related marine ecosystem change
9. Socio-economic impacts
10. Empirical evidence for consensus and dissent among regional climate researchers

Note: Changes to the published BACC I report printed in **bold**. Sections 2c and 2d were sub-sections to the BACC I Baltic Sea section in chapter 2, but are "upgraded" in BACC II to stay now as a separate section each parallel to the section on the Baltic Sea.

Annex 4

Draft time line for BACC II

March 2009:	Nomination of BACC II Science Steering Committee (SSC)
Mid 2009:	Nomination of BACC II lead authors
Early 2010:	Update of BACC 2008 material for HELCOM
June 2010:	Starting BACC II Symposium at 6th BALTEX Study Conference
Mid 2011:	First version of BACC II chapters established (Considering also BONUS projects results to the extent possible)
Mid 2011:	Review/stakeholder conference (of the "BACC/Göteborg 2006" type)
Autumn 2011:	External peer-review completed
End of 2011:	BACC II material revised according to review
March 2012:	BACC II report published
End of 2012:	BACC II book manuscript print-ready
March 2013:	BACC II book published

Appendix 6: WG Utility of RCM meeting minutes

Minutes of the BALTEX Working Group Meeting on the Utility of Regional Climate Models

Place: Max-Planck-Institute für Meteorologie, Bundesstrasse 53, Hamburg, Germany
Time: 23 September 2008, 13.00-19.00
Participating members: Lars Bärring, Ole Bøssing Christensen, Erik Kjellström, Philip Lorenz, Markus Meier (Chair), Burkhardt Rockel, Eduardo Zorita
Guests: Marcus Reckermann (International BALTEX Secretariat), Birgit Hünicke (GKSS)

1) Welcome by the chair and short explanation of the scope of the meeting and the tasks of the WG

2) Information on

   - RCM conference in Lund, 4-8 May 2009
   - IAMAS-IAPSO-IACS Joint Assembly in Montreal, 19-24 July 2009, with session on "Regional Climate Modeling"
   - International BALTEX summer school on "Threats and challenges for the Baltic Sea environment under climate change", Nexø, Bornholm, 27 July – 8 August 2009
   - TELLUS-BALTEX workshop, 1-2 December 2009
   - Conference on "Climate Change – The environmental and socio-economic response in the southern Baltic region", Szczezin, 25-28 May 2009
   - SMHI: RCA-GUESS simulations forced with ERA40 were performed in Lund, new coupled simulations with RCAO forced with ERA40 are in preparation, transient simulations 1960-2100 are planned for 2009
   - MPI: Today no activities on coupled RCM development but within the Excellence Center CliSAP a PhD student will continue to work on the coupled system BALTIMOS, the output will be used for impact studies on fish
   - DMI: no new RCM simulations because of a new computer, coupling with a ice-sheet model over Greenland is planned
   - GKSS: RCM simulations coupled to the HAMSOM model for the Baltic Sea and North Sea are planned
   - A new project (ECOSUPPORT) funded by the BONUS+ program utilizing downscaling with RCAO will start in January 2009.

3) Presentations on the added value of RCMs (7 ppt or pdf files from everybody are available on the internal working group homepage at the BALTEX site www.baltex-research.eu, see Organization, or direct at www.baltex-research.eu/organisation/bwg_rcm.html), brief summary of the presentations and the discussion:

- due to the higher resolution of RCMs topographical details, land-sea masks, lakes, soil moisture, and the feedback of snow covered areas are better represented (especially important for the variables surface wind and precipitation), improvements emphasized where strong local forcing exists, examples: Zahn, M., H. von Storch,and S. Bakan, 2008, Climate mode simulation of North Atlantic Polar Lows in a limited area model, TellusA, Vol. 60, pp 620-631, proxy data for past climate reconstructions are often located in mountain regions requiring high-resolution modeling

- RCMs can generate small-scale variability in a realistic way (evidence supported by Big-Brother experiment) but no added value on the large-scale resolved by the GCMs. However, there is currently a debate whether RCMs can provide also added value on the large scales (e.g. see http://cires.colorado.edu/science/groups/pielke/links/Downscale/

- dynamical downscaling is physically consistent (in contrast to statistical downscaling) and consistent for all variables, areas, times; consistent scenarios are requested from end-users; RCMs are necessary prerequisites for environmental modeling and climate change impact studies in dynamical downscaling experiments

- RCMs enable to separate between internal (generated within the model domain) and external variability (large scale forcing), thus insight into dynamical processes is gained

- RCMs can help to identify common details of various scenarios (testing dynamical hypotheses)

- Sampling network design (Feser, F., and H. von Storch, 2005: A spatial two-dimensional discrete filter for limited-area-model evaluation purposes. Mon. Wea. Rev., 133, 1774–1786).

- Detection studies, e.g. Bhend, J. and H. von Storch, 2008: Is greenhouse gas forcing a plausible explanation for the observed warming in the Baltic Sea catchment area? Boreal Environment Research, accepted

- Bhend, J. and H. von Storch, 2007: Consistency of observed winter precipitation trends in northern Europe with regional climate change projections. Climate Dynamics, DOI: 10.1007/s00382-007-0335-9

- Two-way nesting and spectral nudging improve a RCM simulation. Spectral Nudging improves RCM simulations when driven by global re-analysis data. However, this is not necessarily true for RCMs driven by blobal climate models.

- Discussion about downscaling with RCMs can be found at http://cires.colorado.edu/science/groups/pielke/links/Downscale

4) The work on the report/paper will start after the Lund conference on RCMs. It is decided to focus on environmental modeling in changing climate requiring a consistent dynamical downscaling approach.

5) Next meeting at the RCM conference in Lund, 4-8 May 2009.

6) Other: It is decided to prepare a **common poster for the Lund conference about the added value of RCMs** with input from all working group members (deadline for the input is 1st December 2009). **The focus will be on the Baltic Sea Region and on coupling to impact models.** The writing of the abstract and the preparation of the poster will be performed by Markus. Input: consistent datasets (Lars), quantifying uncertainty in ENSEMBLES simulations (Ole), coupled atmosphere-ice-ocean RCMs (RCAO and BALTIMOS) (Philip), coastal resolution effects or Polar Lows (Burkhardt), influence of topography and dynamical versus statistical downscaling (Erik), feedback related to ice cover (Eduardo), dynamical downscaling is needed for environmental decision support systems (Markus)

Appendix 7: BALTEX Secretariat publications and events

International BALTEX Secretariat (IBS) 2008

IBS Publication Series issues published:

- 22nd BALTEX Science Steering Group Meeting, 23-25 January 2008 in Norrköping, Sweden. International BALTEX Secretariat Publication No. 40, May 2008

Newsletters published:

- Newsletter #11, June 2008
- Newsletter #12, December 2008

Publications authored by the IBS:

- Reckermann M., von Storch H. and Isemer H.-J. (2008): Climate Change Assessment for the Baltic Sea Basin. EOS 89 (17), p161-162
- Reckermann M. and Isemer, H.-J. (2008): BACC – A Regional Climate Change Assessment for the Baltic Sea Basin. LOICZ Newsletter 1/2008
- Isemer, H.-J. and Reckermann M. (2008): BALTEX – A multidisciplinary research network for the Baltic Sea basin. BONUS Newsletter, November 2008
- Reckermann M. and Isemer, H.-J. (2008): BACC book published. BALTEX Newsletter 11, p 4-5.
- Isemer, H.-J. (2008): Academic tribute to Hans von Storch. BALTEX Newsletter 11, p 5.
- Vainio J. and Isemer, H.-J. (2008): Mildest ice winter ever in the Baltic Sea. BALTEX Newsletter 11, p 6-7.
- Reckermann M. and Meier, H.E.M. (2008): BALTEX Workshop on the Utility of Regional Climate Models well received. BALTEX Newsletter 11, p 6.
- Isemer, H.-J. (2008): BONUS creating new momentum for Baltic Sea research. BALTEX Newsletter 12, p 2.
- Reckermann M. and Klemedtson, L. (2008): Tellus-BALTEX Workshop at the University of Gothenburg: Biogeochemical land and Baltic Sea interactions driven by climate and land use. BALTEX Newsletter 12, p 13-14.

Events in 2008 with IBS participation (in chronological order)

- BALTEX Workshop on Utility of Regional Climate Models at the Swedish Meteorological and Hydrological Institute, Norrköping, Sweden (23 January 2008)
- 22nd BALTEX SSG meeting, Norrköping, Sweden (24/25 January 2008)
- 2nd International Advisory Board Meeting of KALME, University of Riga, Daugavpils, Latvia (7-9 May 2008)
- Meeting in Miedzyzdroje, Island of Wolin, Poland, in preparation of the 6th Study Conference on BALTEX in 2010. (15-16 May 2008)
- CEOP Extremes Workshop, Vancouver, Canada, (21-23 May 2008)
- 2nd CEOP Annual meeting, WMO, Geneva, Switzerland (14-17 September 2008)
- BALTEX Working Group on Regional Climate Modelling meeting, Max-Planck Institute for Meteorology, Hamburg, Germany (23 September 2008)
- Rossby Day 2008: Workshop on Nordic-Arctic Climate Change: Towards an Earth System Approach. Swedish Meteorological and Hydrological Institute (SMHI), Norrköping, Sweden. (13-14 October 2008)
- Workshop "Can we save the Baltic Sea? Eutrophication in future climate" Swedish Meteorological and Hydrological Institute (SMHI), Norrköping, Sweden. (21 October 2008)

- Meeting at the University of Szczecin, Poland, in preparation of the International Conference "Climate Change: The environmental and socio-economic response in the southern Baltic region", University of Szczecin, Poland. (7 November 2008)
- Meeting in at Lund University, Sweden, in preparation of the 2nd International RCM Workshop"21st Century Challenges for Regional Climate Research". Lund, Sweden (17-18 November 2008)
- TELLUS-BALTEX Workshop: "Biogeochemical Land and Baltic Sea Interactions driven by Climate and Land Use". Wallenberg Centre of the University of Gothenburg, Sweden (1-2 December 2008)

Appendix 8: Final BALTEX Phase II objectives, goals and potential activities overview

Final Draft revision of BALTEX phase II objectives, goals and potential activities
(consolidated version 9 March 2009, approved by Joakim Langner, Anders Omstedt and Timo Vihma)

Objective 1
Improved understanding of energy and water cycles under changing conditions

Goals

- To evaluate in increasing detail regional models used for climate and environmental studies, and to develop strategies for climate and environmental impact assessments.
- To obtain better and more comprehensive observations from the entire Baltic Sea basin, including new satellite data, in particular to cope with regional resolution requirements.
- To develop further the numerical regional models for the atmosphere, the land surface including rivers and lakes, and the Baltic Sea including sea ice.
- To lower the uncertainty when closing the energy and water budgets from measurements.

Potential activities

PA 1.1 Regional analyses and re-analyses with a high resolution and time span.
PA 1.2 Evaluation and further development of models
PA 1.3 Improvement of quantitative precipitation forecasts.
PA 1.4 Quantification of the energy and water budgets on a high level of confidence.

Objective 2
Analysis of past climate variability and change, and provision of regional climate projections over the Baltic Sea basin for the 21st century

Goals

- To contribute to detecting regional climate change
- To understand the physical mechanisms behind past climate variability and change, whether of natural or anthropogenic origin, in the BALTEX region; and to contribute to attribution studies
- To study the balance between large-scale control and locally/regionally generated forcing of the regional climate system
- To develop projections of future climate variability and change, by means of sensitivity analyses and model studies

Potential activities

PA 2.1 Reconstruction History of Climate in the past 200 Years as well as detailed Re-analysis of "Weather" during the past 40 Years

PA 2.2 Detection and Attribution of Climate Change

PA 2.3 Scenarios based on Evolving Global and Regional Forcing and Response

PA 2.4 Assessment of Climate Change for the Baltic Sea Basin

Objective 3

Provision of improved tools for water management, with an emphasis on extreme hydrological events and long-term changes

Goals

- To develop further and apply coupled atmospheric-hydrological models for improved assessment of the availability of water resources in today's and future climate
- To develop, validate, and apply different modelling systems in selected river basins to assess the impact of climate variability and change on the hydrological regime including the occurrence and severity of extreme events
- To assess future risk of water shortage and extreme events by explicitly taking account of the societal use of groundwater and surface water resources, as well as man-made changes of land use
- To further develop high-resolution observation and data assimilation methods, short-term precipitation forecasts, and flood forecasts
- To analyse local drivers (e.g. land use changes) for long-term changes in hydrology
- To assess past and ongoing hydrological changes

Potential activities

PA 3.1 High Resolution Hydrological Modelling including flood forecasting and scenario models

PA 3.2 Improvement of Parameter Estimates for distributed Hydrological Models

PA 3.3 Coupling Hydrological Models to Regional Climate Models

PA 3.4 Analysis of the Consequences of Climate Change for Hydrology and Water Resources Management

PA 3.5 Hydrological Modelling using Radar-derived Precipitation to improve flood forecasting

PA 3.6 Impact studies on the future hydropower potential with specific consideration of dam safety

PA 3.7 Assessment of the influence of climate change on the occurrence of river and lake ice

PA 3.8 To link water resources studies to coastal zone management

PA 3.9 Assessment of drought risk under changing climate

Objective 4

Biogeochemical cycles in the Baltic Sea basin and transport processes within the regional Earth system under anthropogenic influence.

Goals

- Improving the understanding of biogeochemical processes in the sea with special emphasis on the relationship between nutrients and the cycling of organic carbon and CO_2;
- Identification and quantification of biogeochemical transformations on land that affect the input of biogeochemically relevant substances into the Baltic Sea;
- Improving the understanding of processes in the atmosphere and at the air/sea interface that control the deposition of nutrients and acidic substances and the exchange of bioactive gases;
- Implementing biogeochemical fluxes, from land and the atmosphere to the sea, into regionally coupled atmosphere-land-ocean models including sea ice, rivers and lakes;
- Fostering the coupling of climate and biogeochemical models in order to estimate the consequences of climate change for the regional Earth system of the Baltic Sea basin including the Baltic Sea ecosystem;

Potential activities

PA 4.1 Time series measurements and use of historic data for nutrients, organic carbon and CO_2 in the Baltic Sea for process parameterization and model validation;

PA 4.2 Model based (with data assimilation) space-time detailed description of past variability and change in biogeochemical cycles;

PA 4.3 Implementation of the marine CO_2 system into and improvement of biogeochemical models;

PA 4.4 Increasing the spatial and temporal resolution of monitoring of the riverine input and atmospheric deposition of nutrients and organic carbon;

PA 4.5 Studies on the gas exchange transfer velocity using new technologies;

PA 4.6 Integration of biogeochemical models into existing coupled regional climate models;

PA 4.7 Model based scenarios on future biogeochemical cycles under changing anthropogenic pressures

Objective 5

Strengthened interaction with decision-makers, with emphasis on global change impact assessments

Potential activities

PA 5.1 Identification of Relevant Stakeholders and Users

PA 5.2 Intensification of Contacts between Scientists and Stakeholders/Users

PA 5.3 Organization of Stakeholder/User-relevant Workshops

PA 5.4 Responding to information requirements of decision makers, among others by BACC II book

PA 5.5 Elaboration of Adaptation Strategies to Climate Change in the BALTEX Region

PA 5.6 Identification of Fundable Research Activities

Objective 6

Education and outreach at the international level

Potential activities

PA 6.1 Organisation of BALTEX-related Summer Schools as well as the Integration of BALTEX relevant Topics into National and International Study Programmes including Master and PhD Theses

PA 6.2 Preparation of relevant Study Material for Secondary Schools

PA 6.3 BALTEX-related Evening Lectures

PA 6.4 Establishment of a Web Site dedicated to the General Public

International BALTEX Secretariat Publication Series

ISSN 1681-6471

No. 1: Minutes of First Meeting of the BALTEX Science Steering Group held at GKSS Research Centre in Geesthacht, Germany, 16-17 May, 1994. August 1994.

No. 2: Baltic Sea Experiment BALTEX – Initial Implementation Plan, 84 pages. March 1995.

No. 3: First Study Conference on BALTEX, Visby, Sweden, August 28 – September 1, 1995. Conference Proceedings. Editor: A. Omstedt, SMHI Norrköping, Sweden, 190 pages. August 1995.

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Copies are available upon request from the International BALTEX Secretariat.